1. The economy will get the required impetus with sustained focus on expanding physical infrastructure? Do you agree? Substantiate your views.

Approach

The candidate needs to give his views regarding the sustained focus on expanding physical infrastructure and its effect on economy where the views should be well substantiated with proper facts, examples, etc.

Introduction

Development can be defined as improving the welfare of a society through appropriate social, political, and economic conditions. The expected outcomes are quantitative and qualitative improvements in human capital as well as physical capital such as infrastructures (utilities, transport, telecommunications, etc.) which clearly showcases the importance of expanding physical infrastructure.

Body

- Good quality infrastructure is the most critical physical requirement for attaining faster growth in a competitive world and also for ensuring investment in backward regions.
- This includes all-weather roads; round-the-clock availability of power at a stable voltage and frequency; water for irrigation; railways that are not overcrowded, which run on time and do not overcharge for freight; ports with low turnaround time to reduce costs of imports and exports; etc.
- Physical infrastructure development is an essential driving force for achieving rapid economic growth. Higher investment in physical infrastructure reduces transaction costs as well as other input costs, fosters trade and investment, opens up new markets, improves competitiveness, creates employment opportunities, raises productivity, and stimulates economic activities, which contributes to economic growth.
- Greater access, especially for the deprived population, to transport, telecommunications, energy, electricity, water and sanitation, education and health services are needed to bring inclusive growth and development.
- All these facilities play both direct and indirect role in the development process by increasing the factor productivity of land, labour, and capital in the production process, which promotes economic growth. Lack of infrastructure continues to be a major obstacle to achieve growth and development. Recently, the Indian government estimated that there is a need for nearly $4.5 trillion for reducing physical infrastructure deficit in the country.
- Continuous supply of good quality electrical power from the grid is critical for industries, but the situation in this regard is very unsatisfactory. Large-scale units can deal with this problem by setting up captive power plants, but this is not an economical option for small and medium units.

- Manufacturing also entails movement of large volumes of goods in order to compete in a globalized context and manufacturers need transport infrastructure which can ensure speedy and reliable movement.
- Deficiencies in the road infrastructure must be addressed urgently to increase the competitiveness of Indian manufacturing. Much the same is true of ports where insufficient port capacity and inadequate navigation aid facilities. Without substantial improvement in all these aspects of the transport infrastructure, growth in manufacturing cannot be sustained.
- The COVID-19 crisis has just reinforced the idea of the failing infrastructure in India. To add to this, almost half the country is exposed to severe climate-induced disasters. India desperately needs to buckle up its infrastructure, and while it does so, it can give it a green boost.
- The Indian Railway Finance Corporation Ltd (IRFC) recently established a Green Bond Framework for fundraising, for financing the Dedicated Freight Corridor project and electrification of the railways. India can look into establishing an agency for green financing, to fund the green infrastructure projects of the country to make development more environment friendly.

But at the same time, it is important to consider other investments that would also provide short-term stimulus. To be sure, spending money on pretty much anything will spur growth in a recession if it is debt-financed.

- It has been an article of faith for decades that traditional physical infrastructure—concrete and steel—boosts long-term growth, but evidence suggests that the growth benefits are limited when compared to other areas, especially 21st century digital infrastructure.
- In contrast, investments in digital infrastructure can generate greater overall economic returns. These include both dedicated digital infrastructure (infrastructure that is innately digital, such as broadband, 5G, cloud computing centres) and hybrid infrastructure (adding digital components to traditional infrastructure, such as smart meters, smart grid, and smart cities).
- Further, India's dismal performance in social indicators shows urgent need to invest more in social infrastructure rather than only physical infrastructure.
- This does not imply that physical infrastructure should be ignored. There are potential projects that can have big payoffs, but a policy makers should avoid the notion that massive investment in infrastructure will pay long-term economic dividends. For example, reviving the nationwide smart cities program to help cities and towns use digital technologies to improve operations and improve quality of life can help.

Conclusion

India's goal of becoming a USD 5 trillion economy rests on the completion of critical infrastructure under the National Infrastructure Pipeline. Given the sudden shock to the economy and the resultant recessionary pressures, there is a need for strong re-prioritization of resources towards majors sectors with emphasis on physical infrastructure sector.

2. What are the intended benefits of graded water tariff? Examine.

Approach

Students are expected to write about graded water tariff and also examine the intended benefits of graded water tariff.

Introduction

As per the UN's Dublin Principle (1992), water is an economic good and hence should reflect its scarcity value. Fortunately, this has been recognised by successive National Water Policies. The 1987, the policy envisaged that the water rates should reflect the scarcity value of the resource and foster economy in water use. The 2002 policy envisaged that the water charges for various uses should cover at least the operation and maintenance charges of providing the service initially, and a part of capital costs subsequently.

Body

Graded water tariff:

- Graded water tariff is to fix an appropriate price for water on a graded basis, wherein higher consumption entails higher charges.
- The government has accepted the recommendation of the 15th Finance Commission, which has suggested fixing a graded water tariff to reform the water sector.

Per capita water availability has been declining over the years, and it has now touched the scarcity benchmark of 1,000 cubic meter annually. In such situation we need to study importance of graded water tariff and it's intended benefits such as:

- According to the 15th finance commission, fixing water tariff is necessary because "inappropriate water pricing" is one of the major causes of over-exploitation of water in the domestic sector. Graded water tariffing can work on controlling over exploitation.
- It will enhance the revenue collection. Tariff do not get revised on a periodic basis, resulting in a large gap between the cost of supply of water and the revenue collected. Thus it will create revenue for local bodies and state governments from heavy water usage industries which can be used to subsidies water vulnerable section of society.
- Help in increasing the water use efficiency. Tariff of water will reflect its efficient use and reward its conservation. Graded water tariff will roll out equitable access of water for all and its fair pricing for drinking and other uses will be undertaken by a statutory regulatory authority. It will refrain water determined directly on a volumetric basis. It will be beneficial if Water charges be determined on volumetric basis after taking into consideration equity and efficiency.

- With graded water tariff there will be establishment of water regulator. The water regulator can be made a statutory body and be given a mandate to regulate various water uses and their fair pricing.
- The irrigation sector, which accounts for 90 per cent of the groundwater consumed, which was exempted earlier from levy of Ground Water Conservation Fee (GWCF) can be taken under fold.
- Through graded water tariffing, it is expected to discourage setting up of new industries in overexploited and critical areas and to deter large scale groundwater extraction by industries in these areas.

However, moving towards an elaborate water tariffing is not that easy. There are few challenges involved in it:

- To make a case for water tariffing at a time when the most vulnerable to water shortage are already reeling under severe economic hardship.
- To introduce graded water tariff in the entrenched political economy in different parts of India. Severe water crisis in some parts of the country are in stark contrast to flourishing fields in some other parts.
- The public procurement policies also promote cultivation of water-intensive crops, sometimes in those very states where the usage is most inefficient.
- The most important challenge is the inherent design problems associated with graded water pricing. This is because the government does not exercise control over the sources of water as it does over other natural resources.

Wayforward:

- The government should make people realise that without a price on water usage, it is they who will suffer the worst consequences of a drought.
- Groundwater has to be priced through proxies electricity or diesel used by farmers to pump the water. The strategy for pricing should be such that the cost of migration from one method of irrigation to another or from electricity to diesel offsets the difference in cost between the two.
- It is also important to target irrigation water for pricing purposes because it alone comprises more than 78% of the total water usage in India. Also, irrigation consumption is an area where the scope for increase in efficiency is very high and provide sustainable control over water guzzling crops.

Conclusion

Graded water tariffing is a complex subject and its imposition has huge political overtones. The determination of water-use charges has to be rational, consultative and transparent. And, the role of the statutory water regulator should be recognised.

3. What is a Development Finance Institution (DFI)? Discuss. What are its key objectives?

Approach- Question is straight forward. Candidate is required to define development finance institution and then discuss its importance by giving examples of such institutions.

Introduction

The development finance institutions or development finance companies are organizations owned by the government or charitable institution to provide funds for low-capital projects or where their borrowers are unable to get it from commercial lenders.

Body

What is Development Finance Institution?

- These are specialized institutions set up primarily to provide development/ Project finance especially in developing countries.
- These DFIs are usually majority-owned by national governments.
- The source of capital of these banks is national or international development funds.
- This ensures their creditworthiness and their ability to provide project finance in a very competitive rate.

How is it different from commercial banks?

- It strikes a balance between commercial operational norms as followed by commercial banks on the one hand, and developmental responsibilities on the other.
- DFIs are not just plain lenders like commercial banks but they act as companions in the development of significant sectors of the economy.

Objectives of Development Finance Institutions

- The prime objective of DFI is the economic development of the country
- These banks provide financial as well as the technical support to various sectors
- DFIs do not accept deposits from people
- They raise funds by borrowing funds from governments and by selling their bonds to the general public
- It also provides a guarantee to banks on behalf of companies and subscriptions to shares, debentures, etc.
- Underwriting enables firms to raise funds from the public. Underwriting a financial institution guarantees to purchase a certain percentage of shares of a company that is issuing IPO if it is not subscribed by the Public.
- They also provide technical assistance like Project Report, Viability study, and consultancy services.

Some important DFI's (sector specific)

Industry

- IFCI – 1st DFI in India. Industrial Corporation of India was established in 1948.
- ICICI – Industrial Credit and Investment Corporation of India Limited established in 1955 by an initiative of the World Bank.
- It established its subsidiary company ICICI Bank limited in 1994.
- In 2002, ICICI limited was merged into ICICI Bank Limited making it the first universal bank of the country.

Universal Bank – Any Financial institution performing the function of Commercial Bank + DFI

- It was established in the private sector and is still the Only DFI in the private sector.

IDBI – Industrial Development Bank of India was set up in 1964 under RBI and was granted autonomy in 1976

- It is responsible for ensuring adequate flow of credit to various sectors
- It was converted into a Universal Bank in 2003

IRCI – Industrial Reconstruction Corporation of India was set up in 1971.

- It was set up to revive weak units and provide financial & technical assistance.

SIDBI – Small Industries development bank of India was established in 1989.

- Was established as a subsidiary of IDBI
- It was granted autonomy in 1998

Foreign Trade

- EXIM Bank – Export-Import Bank was established in January 1982 and is the apex institution in the area of foreign trade investment.
- Provides technical assistance and loan to exporters

Agriculture Sector

NABARD – National Bank for agriculture and rural development was established in July 1982. It was established on the recommendation of the Shivraman Committee It is the apex institution in the area of agriculture and rural sectors It functions as a refinancing institution

Housing

NHB- National Housing Bank was established in 1988. It is the apex institution in Housing Finance

Conclusion

India needs DFI's to boost economic growth which would increase capital flows and energize capital markets. To improve long term finances, provide credit enhancement for infrastructure and housing projects. As India does not have a development bank, DFI would fulfil the need for us to have an institutional mechanism.

4. Inclusive growth is the growth that has a high elasticity of poverty reduction. Elucidate.

Approach

Since question is asking you to Elucidate it means you have to explain in detail/to make clear. You have to bring out the connection more clearly by citing evidence and examples.

Introduction

The concept of inclusive growth involves ensuring that fruits of growth and development reach the poor and marginalized sections as well by focussing on equitable growth for all sections of society. Inclusiveness is a multi-dimensional concept. Inequalities that include, social exclusion, discrimination, restrictions on migration, constraints on human development, lack of access to finance and insurance, corruption – are sources of inequality and limit the prospect for economic advancement among certain segments of the population, thereby perpetuating poverty.

Body

INCLUSIVE GROWTH IS THE GROWTH THAT HAS A HIGH ELASTICITY OF POVERTY REDUCTION

- Inclusive growth requires full respect for human rights. Inclusive growth generates decent jobs, gives opportunities for all segments of society, especially the most disadvantaged, and distributes the gains from prosperity more equally.

- The first priority of inclusive growth is to create opportunities for good and decent jobs and secure livelihoods for all including poor. This will make growth inclusive and ensure that it reduces poverty and inequality.

- A development strategy anchored in inclusive growth will have two mutually reinforcing strategic focuses. First, high, sustainable growth will create and expand economic opportunities for poor. Second, broader access to these opportunities will ensure that even the poor members of society can participate in and benefit from growth.

- It involves proper attention and planning for growth that reach the impoverished who remain excluded by circumstance, poor governance, and other market-resistant obstacles.

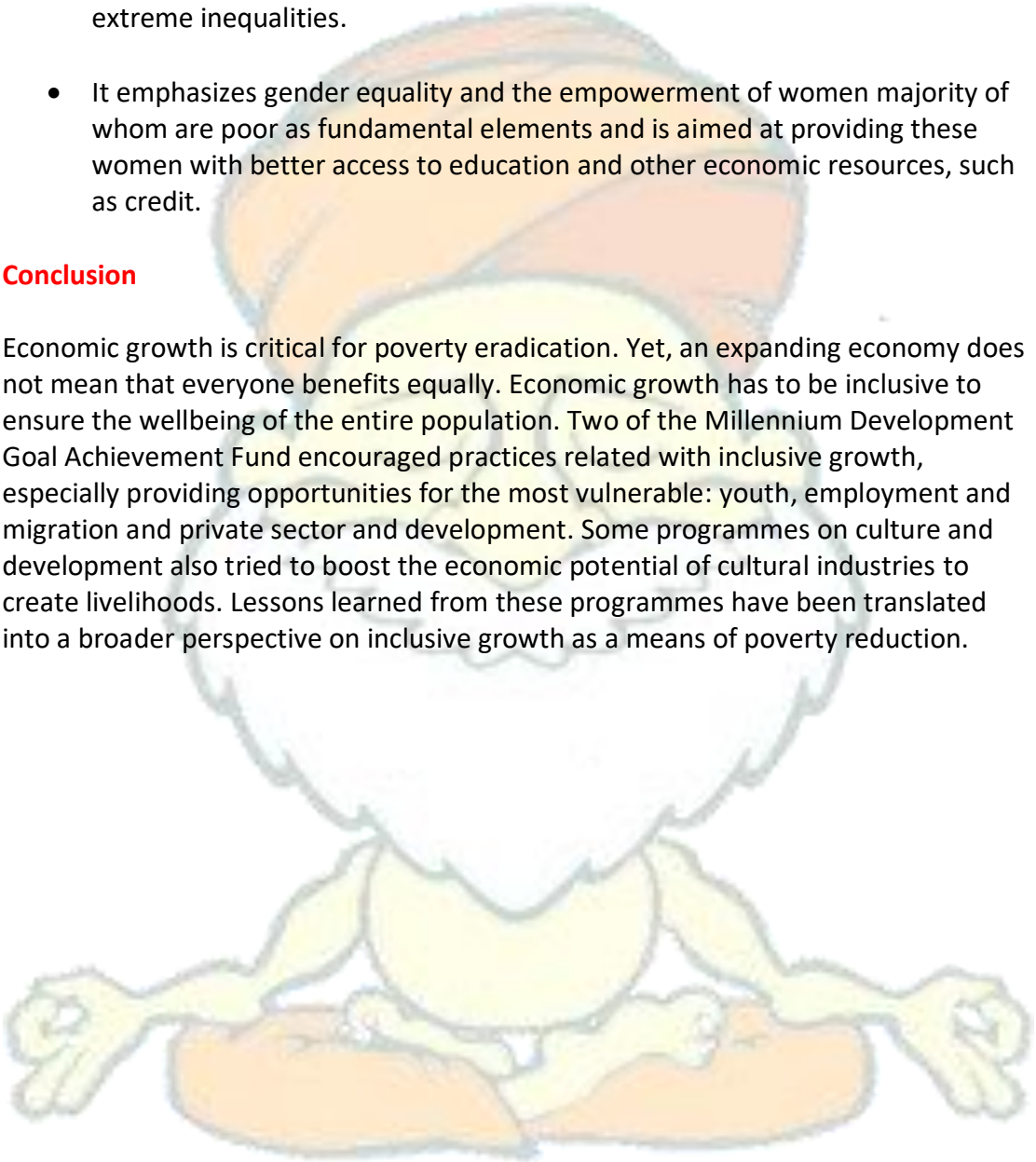
- Achieving inclusive growth in developing countries includes investment in infrastructure to achieve high sustainable economic progress, connect the poor to markets, and increase their access to basic productive assets.

- Provide the opportunity for poor to improve their standards of living, thereby contributing to economic growth, poverty reduction, and the mitigation of extreme inequalities.

- It emphasizes gender equality and the empowerment of women majority of whom are poor as fundamental elements and is aimed at providing these women with better access to education and other economic resources, such as credit.

Conclusion

Economic growth is critical for poverty eradication. Yet, an expanding economy does not mean that everyone benefits equally. Economic growth has to be inclusive to ensure the wellbeing of the entire population. Two of the Millennium Development Goal Achievement Fund encouraged practices related with inclusive growth, especially providing opportunities for the most vulnerable: youth, employment and migration and private sector and development. Some programmes on culture and development also tried to boost the economic potential of cultural industries to create livelihoods. Lessons learned from these programmes have been translated into a broader perspective on inclusive growth as a means of poverty reduction.



5. What are the key elements of inclusive and equitable growth? Discuss. What are the challenges of inclusive economic growth in India? Examine.

Approach:

As the question is very straight forward in its approach, students are expected to briefly explain the inclusive and equitable growth in India in Introduction also proper explanation of the points is needed, Also in the second part of the answer mention challenges as well with proper explanation .

Introduction:

Inclusive growth means economic growth that creates employment opportunities and helps in reducing poverty. It means having access to essential services in health and education by the poor. It includes providing equality of opportunity, empowering people through education and skill development. The concept of inclusive growth is based on the recognition that economic growth must be increasingly 'pro-poor'. The concept represents recent thinking on development, and supplants the ideas of 'trickle-down development' advocated in the 1950s and 1960s.The concept of equitable growth entails the inclusiveness with equal proportion of the growth percolation among the population. It also encompasses a growth process that is environment friendly, aims for good governance and helps in creation of a gender sensitive society.

Body:

Key Elements of inclusive and equitable growth:

Economic Growth-

- India is among the fastest-growing major economies in the world. However, currently Indian economy is facing slowdown due to both cyclic and structural challenges. Economic growth is the main element of inclusive and equitable growth because with out growth trickle down is not possible at all.

Financial Inclusion-

- Financial Inclusion is the process of ensuring access to financial services to vulnerable groups at affordable costs. Financial inclusion is necessary for inclusive growth as it leads to the culture of saving, which initiates a virtuous cycle of economic development.

Technological Advancement-

- It is an important aspect of inclusive and equitable growth in terms of decreasing the growth divide between Rich and poor and between government and the people, Initiatives in this regard such as Digital India mission, use of JAM trinity in delivery of services has been quite effective in bringing transparency and accountability in governance also with industrial revolution 4.0 new technological advancements can be revolutionary in bringing governance very close to people . Technology can help combat challenges in Agriculture by making value chain more efficient and

competitive also new innovative digital technologies can be used by increasing accessibility and adaptability of learning. Technology can also bring a sea-change in sectors like Health and manufacturing through changes in the production process and remote health services.

Social development and environment protection-

- Protection of the marginalised sections like women, tribal groups, minorities and other weaker sections is also an important aspect of inclusive and equitable growth it helps in bringing population towards the mainstream economy and increase their accessibility in growth process and ease of living. Economic growth through reckless use of resources and at the cost of environment cannot be inclusive it must be sustainable as well.

Skill development and employment opportunities-

- Harnessing the demographic dividend and growth for all that is the participation of people in the growth process will depend upon the availability if jobs and development of skills. India is facing a dual challenge of providing enough employment opportunities and enhancing skill level of the employable youth.

Challenges of inclusive growth:

Poverty-

- As per multi dimensionality index India lifted 271 million people between 2005-06 and 2015-16 out of poverty despite these massive gains still 22% of the population lives below poverty line.

Unemployment-

- As per Periodic labour force Survey total unemployment rate in India stands at 6.1% with the impact of COVID pandemic and the measures taken to curb it like complete lockdown unemployment rate further shifted towards the upperside thus creating more severe challenge of reaping the benefits of demographic dividend and inclusive growth.

Agricultural issues-

- Around 44% of the population depends on the agriculture with low income levels its contribution towards GDP stands at 16.5%. Almost 60% of agriculture is rainfall dependent thus making it more vulnerable to natural climatic extremities.

Issues in social development-

- Significant regional, social and gender disparities, Low level and slow growth in public expenditure particularly in health and education, The poor quality delivery system, Social indicators are much lower for OBC, SC, ST, and Muslims, Malnutrition among the children – India still ranks at 102 in the Global Hunger index.

Maintaining rapid growth while making growth more inclusive-

- The growing disparities between urban and rural areas, prosperous and lagging states, skilled and lowskilled workers. New challenges brought by COVID 19 pandemic like increased fiscal deficit,unemployment less

production and consumption has further aggravated the challenges to increase growth levels in a sustainable manner.

Improving the delivery of core public services-

- The incomes rise, citizens are demanding better delivery of core public services such as water and power supply, education, policing, sanitation, roads and public health. As physical access to services improves, issues of quality have become more central. There are four avenues for reform: internal reform of public sector agencies, producing regular and reliable information for citizens, strengthening local Governments and decentralizing responsibilities; and expanding the role of non-state providers. It however cautions that planned reform alone cannot bring about the desired changes- ultimately implementation is everything.

Regional disparities-

- Factors like caste, inequality, availability of resources, corruption contributes to the regional disparities where some specific groups hold more previliges than others. This creates a big challenge in bringing inclusiveness in growth pattern in India.

Conclusion:

The post reform period witnessed increase in disparities across regions and social groups and between rural and urban areas. There is a need to have a broad based and inclusive growth to benefit all sections of the society. The challenges in most important elements of inclusive growth are agriculture, poverty and employment, social sector and regional. There are strong social and economic reasons for achieving broader and inclusive growth. To inclusive growth is a wider connotation encompassing social, economic and political factors. Through innovative partnerships with an international organization, civil societies, and private companies, inclusive and equitable growth can be targeted.Inclusive growth will help in the empowerment of vulnerable and marginalized populations, improve livelihoods, and augment skill-building for women. New India is the India of aspirations, Inclusiveness in the growth process is must for the prosperity of all.

6. Can inclusive growth be ensured without a sustained and high growth rate? Critically comment.

Approach

Candidate needs to comment upon the argument that inclusive growth can be ensured without a sustained and high growth rate and also give points counter to the discussion in question through proper substantiation in terms of facts, examples, etc.

Introduction

Inclusive growth is the equitable allocation of resources with an aim to ensure the development of every section of the society. It includes the inclusion via poverty reduction, agriculture development, and social sector development including education, health, environmental sustainability etc. where many debate its relation with high and sustained growth rate of economy for overall prosperity.

Body

Inclusive growth results in lower incidence of poverty, broad-based and significant improvement in health outcomes, universal access for children to school, increased access to higher education and improved standards of education, including skill development. It is also reflected in better opportunities for both wage employment and livelihood, and an improvement in the provision of basic amenities like water, electricity, roads, sanitation, and housing.

High economic growth has raised living standards around the world and is a necessary criteria to overcome the burden of poverty and inequality and move towards the goals of inclusive growth.

- High pace of growth is important, but how growth is generated is critical for growth sustainability and for accelerating employment creation and poverty reduction. For example, China grew in double digits for sustained period of time to bring majority of its population out of poverty.
- Rapid pace of growth and employment can be achieved through extensive growth, which requires expansion of capacity, but for this type of growth to be sustainable and for employment to be productive, there must be periods when growth is intensive and accompanied by productivity improvements and innovation.
- For growth to be sustainable in the long term, it should be broad-based across sectors. Issues of structural transformation for economic diversification therefore take front stage. However, some countries may be an exception and continue to specialize as they develop due to their specific conditions (e.g., small states).

- It should also be inclusive of the large part of the country's labour force, where inclusiveness refers to equality of opportunity in terms of access to markets, resources, and unbiased regulatory environment for businesses and individuals.
- Inclusive growth should focus on productive employment rather than income redistribution. Hence, the focus is not only on employment growth, but also on productivity growth.
- Inclusive growth should not be defined in terms of specific targets such as employment generation or income distribution. These are potential outcomes, not specific goals.

But modern economies have lost sight of the fact that the standard metric of economic growth, gross domestic product (GDP), merely measures the size of a nation's economy and doesn't reflect a nation's welfare. This kind of focus on singular factor to measure economic growth leads to many issues, some of which are discussed below –

- The debate between growth and equity and redistribution is one of the oldest in economic development. The common citizens of any country care more about the real impact of growth in terms of improvement in their standard of living, provision of basic facilities such as electricity, drinking water, healthcare systems etc.
- Focus on sustained and high growth rate invariably leads to focusing exclusively on GDP and economic gain to measure development which ignores the negative effects of economic growth on society, such as climate change and income inequality.
- Ineffective trickle down of benefits earned from high economic growth. There is increasing disconnect between economic growth and social development. As per popular development economist Jean Dreze, India's high economic growth has failed to bring about any significant improvement in the quality of life of the common people.
- Despite the high growth rates in India, almost half of the children younger than 5 years are stunted due to improper nutrition and sanitation. As of 2018, more than 163 million Indians do not have access to safe drinking water. As per the Tendulkar methodology, 22% of Indians live on less than $1.25 a day.
- For ensuring inclusive growth, economic growth of lower strata should be faster than the affluent class. However, India has experienced one of the highest rates of growth of inequality. As per OXFAM survey India's richest 1% holds four times of the wealth held by 70% of bottom population which is around 1 billion.
- Certainly focus on only high growth fails to account pie of growth of shared by different sections of society which makes it ineffective indication of national progress. Though, it is necessary to generate wealth in the first place to redistribute it, however overemphasis on high growth rate may create huge inequality and disparity.

- Sustained and high economic growth cannot differentiate between an unequal and an egalitarian society if they have similar economic sizes. Thus, rising inequality is resulting in a rise in societal discontentment and increased polarization.

India need alternative metrics to complement GDP in order to get a more comprehensive view of development and ensure informed policy making that doesn't exclusively prioritize economic growth. E.g. - Bhutan's Gross National Happiness, and UNDP's Human Development Index (HDI). Further, India is also beginning to focus on the ease of living of its citizens which is evident from –

- Rural development with Agriculture centric approach. E.g. Rain-fed area development program, integrated rural development programme.
- Electrification to every house under Saubhagya Yojana.
- Targets of reducing infant and under-5 mortality rate under swachh bharat mission than just building toilets.
- Emphasis on Last mile reach: for instance, the target under 100% immunisation target under Mission indradhanush and follow up under Intensified Indradhanush scheme.
- Preventive approach than curative by addressing the core issues. E.g. emphasis on primary health care under Ayushman Bharat by creating health and wellness centres.
- Gender inclusion: At present, the element of gender equality as a part of inclusive development is more focussed. E.g. Gender budgeting, women empowering schemes like Kanyashree Prakalpa of West-Bengal etc.,

Along with these fundamental measures for social sector, the focus is also on improving the business environment in the nation through efforts like improving ease of doing business ranking as well as schemes like Make in India as well as Production Linked Incentive's (PLI's) recently announced in budget.

Conclusion

As a practice of good governance, it has been always incorporated in India to – 'wiping every tear from every eyes' to the latest with the objective of 'Sabka sath sabka vikas' which encapsulates the core philosophy of inclusive growth to overcome the tag of a 1% economy where the end goal is to be more just and equitable society that is economically thriving and offering citizens a meaningful way of life.

7. Why is it important to have a stable tax regime? Analyse.

Approach

Students are expected to write about stable tax regime and analyse the importance to have a stable tax regime.

Introduction

Paying taxes is a mark of civilisation. Stability is one of the three fundamentals for policymakers to consider when trying to design and implement a good tax system, alongside simplicity and certainty. For individuals and businesses alike, stable tax regime is fundamental to effective planning and efficient compliance.

Body

One of the likely reasons for India to suffer a relatively poor reputation in larger global community of investors was when it comes to the stability of its tax regime. By not tinkering with tax rates in this budget 2021 whether corporate tax, personal income tax, peak rates of Customs duty or GST the Government has sent out a strong signal to the that India is indeed a stable tax regime where they should be looking to invest.
Importance of stable tax regime:

- Create Ease of doing business: Stable and moderate tax regime will give thrust and a clear road map to ease of doing business. The Economic Survey suggested that the measures that need to be taken soon should include a clear, transparent, and stable tax and regulatory environment.
- Refrain from retrospective taxation: While governments often use a retrospective amendment to taxation laws to "clarify" existing laws, it ends up hurting companies that had knowingly or unknowingly interpreted the tax rules differently. For example Vodafone case. With stability in tax regime government provide simple, predictable and transparent tax regime that stands beneficial for companies and well nurture the economy.
- Tax terrorism to tax transparency: Domestic tax laws allow the authorities to issue 'demand notices' even to people who have paid all their taxes for the year and have dutifully filed their returns. But with stable tax regime less fluctuations in tax rules set efficient tax administration and increase the tax transparency.
- Bring about certainty: Common procedures for registration of taxpayers, refund of taxes, uniform formats of tax return, common tax base, common system of classification of tax slabs will lend greater certainty to taxation system.
- Increase in disposable income: With stability in tax regime disposable income increases, households have more money to either save or spend, which naturally leads to a growth in consumption. Consumer spending is one of the

most important determinants of demand; it creates the demand that keeps companies profitable and hiring new workers.

- Increase tax Compliance and broaden tax base: Certainty with stable tax regime will enhance environment for compliance as all returns are to be filed on stable rate. Compliance increase will also help in broaden tax base. The improved compliance and increased tax base have resulted in a rise in the tax to GDP ratio. The same has reached 12%, which is the highest in the recent past (the ratio was 10.1% in 2013-14).
- Helps in streamline taxation: Through stability in tax regime there is harmonisation of laws, procedures and rates of tax between Centre and States and across States. It is expected to reduce cost of taxation and inflation in the economy.
- Improved competitiveness: Reduction in transaction costs of doing business would eventually lead to an improved competitiveness for the trade and industry. World Bank believes that the implementation of the stable tax regime with Goods and Service Tax (GST), is the most crucial reform that could improve competitiveness of India's manufacturing sector.
- Reducing pendency: Stability in tax regime especially when coupled with the increasing digitalisation of tax compliance creates mechanisms for early dispute resolution reduce pending tax litigation in Tax Appellate Tribunal should serve to improve investor sentiment.
- Stable and predictability: A stable tax regime is welcome as we believe that a predictable policy environment is critical for sustained growth and to attract more investments into the country.

Conclusion

Overall, India's long-running objective of achieving stability in tax regime and minimising disputes, appears to have been achieved in this Budget. Taxes for the upcoming Budgets should focus on mainly clarity in law, simplification of procedures and reduction of litigation, facilitating business transitions apart from exemptions and deduction will in turn promote ease of doing business in the country. It is hoped that these measures pave the way for a thriving national economy in the near future.

8. Do you think the policy of liberalization has attained its full potential in India? Critically examine.

Approach- Question is analytical in nature. Student can give a brief evolution of liberalization in the beginning and then analyse the impact policy made on Indian economy and society. Future path of economy can be given in later half of the answer.

Introduction

"No power on earth can stop an idea whose time has come," said then finance minister Manmohan Singh quoting Victor Hugo while presenting the Union Budget on 24 July 1991. And with these words started the long and painful process of economic liberalisation in India.

Body

The liberalisation was aimed at ending the licence-permit raj by decreasing the government intervention in the business, thereby pushing economic growth through reforms. The policy opened up the country to global economy. It discouraged public sector monopoly and paved the way for competition in the market.

- In 1991 India embarked on major reforms to liberalize its economy after three decades of socialism and a fourth of creeping liberalization.
- Twenty-five years later, the outcome has been an outstanding economic success. India has gone from being a poor, slow-growing country to the fastest-growing major economy in the world.
- The World Economic Outlook for 2016 says that the United States and India are the two pillars of strength today that are helping hold up a sagging world economy.
- Yet those successes have been accompanied by significant failures and weaknesses in policies and institutions. The past 29 years of liberalization are largely a story of private-sector success and government failure and of successful economic reform tarnished by institutional erosion.
- The quality of government services remains abysmal, and social indicators have improved much too slowly. The provision of public goods — police, judiciary, general administration, basic health and education, and basic infrastructure has seriously lagged improvements in economic performance.
- India's economic reforms have been highly successful in moving the country from low-income to middle-income status, despite little improvement in its institutions and quality of public goods. To sustain rapid growth and to become a high-income country, India will need major reforms to deepen liberalization and build high-quality institutions.
- India is about to reap a demographic dividend that will give it a big edge over rivals. The number of working-age people between 15 and 60 is expected to rise by 280 million between 2013 and 2050.

India and liberalization

- India's working-age population has started rising, yet participation in the workforce has actually fallen in recent years, especially for females. It is partly because, as families rise from low-income to lower-middle-income status, they pull their women out of manual work as a mark of social superiority.
- Economic liberalization has benefited Dalits, the lowest of the Hindu castes, once condemned to the dirtiest work, such as cleaning latrines, cremating the dead, and handling dead animals and their hides. A seminal survey in two districts of Uttar Pradesh revealed striking improvements in the living standards of Dalits in the past two decades.
- In the two decades since 1991, India's literacy rate has shot up by a record 21.8 percentage points, to 74 percent.
- Leftist critics accuse India of going down the path of neoliberalism. The actual process could better be called neo-illiberalism. Although many old controls and licenses have indeed been abolished over the past 25 years, many new controls and bureaucratic hurdles have appeared, mostly in such areas as the environment, forests, tribal rights, and land and in new areas like retail, telecom, and Internet-related activities.
- Markets cannot function without good governance. With almost no exceptions, the delivery of government services in India is pathetic, from the police and judiciary to education and health.
- Justice is supposed to be blind. In India, it is also lame. India holds the world record for legal case backlogs (31.5 million), which will take 320 years to clear, according to Andhra Pradesh high court judge V. V. Rao. India's Law Commission has recommended the appointment of 50 judges per million population. The current sanctioned judicial strength is just 17 per million, and unfilled vacancies are as high as 23 percent in the lower courts.
- Many infrastructure areas earlier reserved for the government were opened to private-sector participation, often in public-private partnerships, and many of them were bedeviled by crony capitalism.
- The quality of the delivery of government services remains poor. The big improvements in private-sector competitiveness are not even remotely replicated in government service competitiveness. India's social indicators remain dismal.

Conclusion

Liberalization remains unfinished agenda in Indian context. Though we have successfully crossed many socio-economic barriers, we still lack in building robust social infrastructure to be able to deliver fruits of liberalization to our population. India lags far behind in social indicators and many policies hurt free flow of capital and goods. Road of freedom is only half travelled and lot needs to be done to be able to realize our full potential.

9. Can India emulate the Chinese model of export led growth strategy? What are the challenges on this front? Discuss.

Approach:

Above question has two parts first part is about suitability of export led growth strategy for india and the second one is challenges, students are expected to give a brief about what export led growth strategy means in introduction and then explain its suitability for india and challenges of implementation. Arrive at a balanced logical and forward looking conclusion at the end.

Introduction:

Export led growth is where a significant part of the expansion of real GDP, jobs and per capita incomes flows from the successful exporting of goods and services from one country to another. In recent years a number of countries have experienced rapid growth across a number of export industries which has helped to fuel their long-run expansion. These nations include China, Ireland, South Korea, Singapore, Hong Kong, Vietnam, Ethiopia and other emerging countries. The opposite of an export led growth is import substitution where countries strive to become self sufficient by developing their own industries.

Body:

China's strategy for growth-

- China's export- led growth is rooted in a double transition of structural change and demographic transition. China began to adopt the ELG model in the early 1980s with features like trade liberalization, Reindustrilization, focus on processing trade all led to a successful trade strategy and helped china to achieve a sustained growth for over a decade.
- China's emergence as a low cost manufacturing hub and leading merchandise exporter was enabled by a relatively favourable interntional economic factors, major consuming markets like USA, the EU and Japan were relatively open and expanding .
- China has become increasingly integrated into the gloal supply chains of multinational conglomerates like Apple and Microsoft. The supply chains consist of production facilities spread across number of countries, India's participation in these supply chains is weak.

Can India emulate the Chinese model-

- The idea of turning the Indian economy into an export-led economy is not new. This idea is visible in the objectives of Make in India program and Economic Survey has proposed the creation of a Shenzhen-style Autonomous Employment Zones (China), which would be characterized by a highly entrepreneur-friendly regime with respect to land, labour, enforcing contracting and international trade. China was the last country to lift itself out of poverty by becoming the factory to the world, but economic experts

doubt that global demand in the post-covid era will be enough to accommodate another manufacturing giant to arise.

Due to the different geo-economic scenario today, it is contemplated that the export-led growth may not be viable for India because of the following reasons-

- Many global economists are of the opinions that today's world is unlikely to sustain export-led growth, due to the problem of : depopulation, declining productivity, high debt, and deglobalization. Demand in most parts of the developed world will not grow too fast, as they are ageing (Japan, northern Europe), and demand in the developing world will also decline in the near future. As the US is turning protectionist and the EU has in place many trade barriers, this will further reduce demand for developing countries' exports.
- The developed countries are increasingly turning to high tech to produce cheap consumer goods, which require fewer workers and are therefore cost-effective. Thus, manufactured goods in developed countries are slowly replacing the cheap imports from developing countries.
- The structural reforms like labour reforms would have had a significant impact in 1991, but are unlikely to provide the same growth boost today. This is because businesses have found other ways to deal with inflexible labour laws, as technology seems to have replaced all other factors of production as the main driver of growth.
- Most of the goods in India are produced in the medium and small enterprises and have poor quality. This is because the labour involved in the production is lacking adequate training in skills, education, and is less disciplined than in India's competitor countries.
- A large part of India's growth story in the past decade has been due to a rise in India's exports from 9.3% of gross domestic product (GDP) in 2000-01 to 16.8% of GDP in 2013-14. But, with export growth turning negative in recent months, there are signs that the export push is running out of steam.
- COVID 19 pandemic has forced countries to change strategies for achieving high growth India has been in the forefront of steering economy from what experts called a technical recession, with the disruption of global supply chains and rise of protectionism, Atmanirbhar Bharat is the new strategy in place to make India self reliant in the production process and to increase domestic demand.

Conclusion:

The idea of the export-led economy has been very successful for many East-Asian countries (also called East-Asian Miracle). In the 1960s and 70s, these countries transformed their economies rapidly from developing countries to become middle-income countries through high export. However, the viability of a new export-based economy, that India aspires to be, depends on policy restructuring, reaping demographic dividend and leveraging its domestic market.

10. Do you think disinvestment of public sector units can bring in efficiency and promote competition? Critically comment.

Approach

Define disinvestment of PSUs and comment on whether disinvestment of PSUs can bring in efficiency and competitiveness or not. We need to deliberate on both sides of the argument.

Introduction

Budget 2021-22, set a disinvestment target of Rs 1.75 lakh crore. As per government perspective disinvestment means sale or liquidation of assets by the government, usually Central and state public sector enterprises, projects, or other fixed assets.

Body

Currently public sector units (PSUs) are infested with inefficiencies and uncompetitive practices like government interference, low capacity utilisation, huge debt burden, inability to innovate, substantial time and cost overruns, slow decision making process, low work ethics, unequal playing field for private sector, etc.

Disinvestment can bring in efficiency and competitiveness in following ways and means –

- Encourage private participation and investment in PSUs operations.
- Minimizing debt: Debt of both PSUs and government can be reduced with disinvestment revenues.
- Attracting Investment: Funds for scaling up and up-gradation.
- Rise in capacity and profit: Hindustan Zinc saw a 100 fold in its profits and six fold rise in capacities.
- Technology adaptation: disinvestment funds can be used to adopt latest technologies.
- Accountability and Transparency: Disinvestment increases scrutiny and answerability towards corporate and retail stakeholders.
- Social sector investment: Disinvestment revenue can be used for implementing social programs in health and education sectors

However, disinvestment has following issues –

- Inefficient and low valuation of PSUs: Disinvestment of PSU stakes and assets at rates below its real or potential market value. E.g.: Disinvestment of IRCTC.
- Strategic concerns: Disinvestment in defence, oil exploration, nuclear facilities, etc. may cause national security issues.
- Fear of crony capitalism and monopolies.
- Rise in economic and social inequalities.

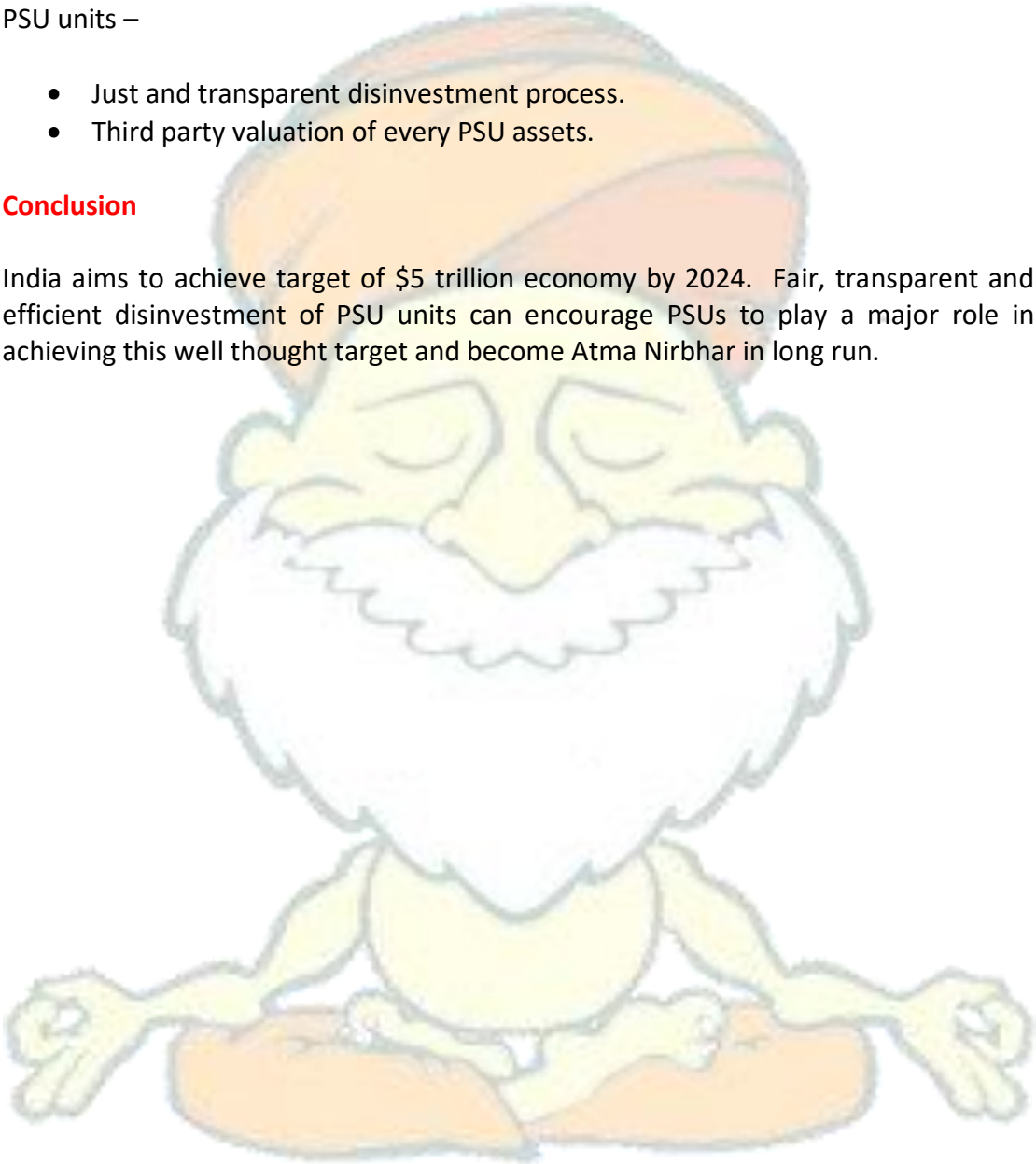
- Loss of revenue (i.e. profit and dividend) to the government.
- Encourage regressive fiscal practices: Increased dependency on disinvestment revenue is an unhealthy and a short term practice.
- Lack of assurance: Disinvestment does not always ensure efficiency and competitiveness.

Government need to take following measures to ally concerns of disinvestment of PSU units –

- Just and transparent disinvestment process.
- Third party valuation of every PSU assets.

Conclusion

India aims to achieve target of $5 trillion economy by 2024. Fair, transparent and efficient disinvestment of PSU units can encourage PSUs to play a major role in achieving this well thought target and become Atma Nirbhar in long run.



11. What is an avalanche? How does it occur? Explain.

Approach

Question is straightforward students are expected to write about the what is avalanche and explain how does it occur.

Introduction

In India, Himalayan region is well known for occurrence of snow avalanches particularly the Western Himalayan region snowy regions of Jammu and Kashmir, Himachal Pradesh and Uttarakhand. In the Kargil district, the Indian Army has another big adversary besides Pakistan. Over 1,000 Indian soldiers, including over 35 officers, have lost their lives in the Siachen Glacier-Saltoro Ridge region since April 1984.

Body

Avalanche:

- An avalanche is a mass of snow that slides rapidly down an inclined slope, such as a mountainside or the roof of a building. Avalanches are triggered by either natural forces (e.g. precipitation, wind drifting snow, rapid temperature changes) or human activity. In mountainous terrain, they are among the most serious hazards to human life and property.
- There are various kinds of avalanches: Such as rock avalanches (which consist of large segments of shattered rock).Ice avalanches (which typically occur in the vicinity of a glacier).Debris avalanches (which contain a variety of unconsolidated materials, such as loose stones and soil).

An avalanche is typically triggered when material on a slope breaks loose from its surroundings; this material then quickly collects and carries additional material down the slope. Let us study in detail how Avalanche occur:

- Steeper Slopes: An avalanche is caused by the influence of gravity. If gradual snowfalls accumulated on the slopes of the mountain then it prone to rush downs the slopes at greater speeds.
- Layering of Snow: The gradual snowfall creates layer by layer accumulation of snow that hypersensitive the snowpack. If something catastrophic events happen then these layers of snow falls down that leads to avalanche.
- Due to Snowstorm and Wind Direction: Heavy snowstorms are more likely to cause Avalanches. The 24 hours after a storm are considered to be the most critical. Wind normally blows from one side of the slope of the mountain to another side. While blowing up, it will scour snow off the surface, which can overhang a mountain.
- Due to Heavy Snowfall: Heavy snowfall is the first since it deposits snow in unstable areas and puts pressure on the snowpack. Precipitation during the summer months is the leading cause of wet snow avalanches.

- Earthquakes: It is one of the important factors that triggered the layer of accumulated snowpack because earthquakes generate seismic waves that cause the ground to vibrate.
- Movements or Vibrations Produced by Machines and Explosives::During the developmental activities, the terrain vehicles in regions with unstable layers of snow can dislodge the layers from the surface and cause them to slide down under gravity.
- Deforestation-Deforestation, clearance, or clearing for developmental activity makes the mountain region an avalanche-prone area more susceptible to deadlier avalanches.
- Human Activity: Humans have contributed to the start of many avalanches in recent years. Winter sports that require steep slopes often put pressure on the snowpack, which it cannot deal with. Combined with the heavy deforestation and soil erosion in mountain regions, it gives the snow little stability in the winter months. They can also be triggered by skiers, snowmobiles, hikers, vibrations from machinery or construction.

Mitigation steps in Avalanche prone areas:

- Accurate avalanche prediction requires an experienced avalanche forecaster who often works both in the field to gather snowpack information and in the office with sophisticated tools such as remotely accessed weather data, detailed historical weather and avalanche databases, weather models, and avalanche-forecasting models.
- Setting up Quick Response Teams (QRTs) from local administration and the NDRF, equipped with standard avalanche equipment and devices such as GPS, Radio Beacons, and shovels, etc.
- The Border Road Organization (BRO) keeps vigil for keeping the highways clear after avalanches, particularly in the Rohtang Pass and the Baralachala Pass.
- SASE which is a laboratory of the Defence Research and Development Organization (DRDO) has issued an Avalanche warning to Leh in Ladakh region.
- Construction of power lines, highways and railroads must be avoided, if done then minimum impact designs should be implemented.

Conclusion

India's unique geo-climatic conditions and high socio-economic vulnerability to calamities are responsible for increased frequency in natural disasters. Disasters are no longer to be considered as occurrences that are to be managed through emergency response services. So, there is a need to foster a culture of prevention and identification of the key issues to be addressed especially in the development process. The path ahead for managing disasters is to bring in a people-centered development strategy with decentralised planning, implementation and monitoring and control.

12. The impetus on infrastructure expansion in India's Northeast will reap huge economic and strategic benefits for India. Do you agree? Substantiate your views.

Approach:

The question is straight forward in its approach, students are expected to write about strategic and economic benefits of infrastructure development in the North East region, also mention about the socio economic conditions of the region and substantiate your view points properly .

Introduction:

Regional disparities especially in socio economic development are a ubiquitous phenomenon across India. India's North Eastern region (NER) comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura is a poorly developed and tribal population dominated region in India. In spite of having some similarities in life style of majority of the population and a common Mongoloid origin, sharp differences exist in the status of socioeconomic development. Infrastructural push will play an important role in bringing North East at par with the rest of the country in terms of connectivity, growth and opprotunities. Inadequate infrastructure and poor connectivity are the major constraints to development in the region. Not only is the region poorly connected to the rest of India, it is also poorly connected to neighbouring countries in Southeast Asia.

Body:

- Infrastructure is the backbone of economy it has a higher multiplier effect playing key role in bringing investment, increased production capacity and opportunities for growth and employment. In North-East-Region, infrastructure is the most critical aspect to improve connectivity, strenghthen strategic ties, enhance border security, improve trade and people to people ties with the South-East Asian Countries.
- Budgetary allocations towards infrastructural development has been increased significantly over the years towards central sector schemes such as North east special infrastructure development scheme, Ministry of DONER, North east road infrastructure development scheme etc.

Economic benefits of infrastructure development-

- Along with connectivity, the level of economic activity is bound to increase. Previously, even fiscal concession given to the states failed to attract significant industrial investments. The reason was high logistical costs of moving merchandise to high consumption regions. In this context, better connectivity provides a booster shot to economic activity.
- Surrounded by international borders, infrastructure development — both internal and international — could be the best choice for inclusive

development in India's Northeast. International infrastructure, which is also termed as connectivity, may help the NER to become more economically engaged with neighbouring countries.

- Building resilient infrastructure also requires development of the border in Northeast India and facilitation of border trade. The border is seen as a connector and as an economy-building asset rather than a deterrent. In recent years, India's trade with Bangladesh and Myanmar witnessed a steep rise in growth, which indirectly suggests the existence of a large trade potential. However, supply-side constraints, among others, inhibit the two-way trade across the borders with India's two neighbours. Enhancing Northeast India's existing level of trade and economic linkages between Bangladesh and Myanmar would need infrastructure and institutional support, which would facilitate growth and remove the region's economic isolation.
- The Northeastern states of India are likely to gain more from the Trilateral Highway, compared to many other Indian states. Removing the status quo, therefore, means the NER has to invest in building physical and institutional infrastructure, which in return would lead to higher production — both within and across borders — and industrialisation, which will foster innovation and enhance the economic linkages with the neighbouring countries.
- Infrastructure development could boost the tourism industry in the north east to its highest potentioal which will have multiplier effect on the overall economy of the region.
- Lack of infrastructure in north east region has left horticulture industry which includes bamboo, forest produce and other products in a disarray without access to markets horticulture could not bring benefits to the people of the region.Infrastructure development will play a key role in the development of horticulture by providing access to markets and new technologies.

Strategic benefits of infrastructure development-

- The India-Myanmar-Thailand Trilateral Highway will play a key role in this and help improve connectivity between India and Thailand and others in the neighbourhood. India also has plans for a global electricity grid that may initially aim to link countries such as Myanmar, Thailand, Cambodia, Laos, and Vietnam with the Indian sub-continent, as part of an evolving energy security architecture.
- In order to counter Chinese influence India is working on a slew of road and bridge projects to improve connectivity with Bangladesh, Nepal and Myanmar. These include road networks connecting Aizawl in Mizoram with Kaladan in Myanmar and Imphal in Manipur with Tamu, also in Myanmar. India is also expediting the South Asian Sub-Regional Economic Cooperation (SASEC) road connectivity programme.
- India's Act East Policy is a significant cornerstone of the Indo-Pacific strategy, adding that ASEAN is at the core of Act East Policy, Development of north east region plays a key role in realizing the benefits of act east policy.

- Development of infrastructure plays a key role in bringing ease of living for the people in the region, thus acts as an antidote to the separatist feelings and against the terrorism present there.
- Incidents like Doklam call for greater infrastructural push in terms of connectivity to allow fast movement of security forces in times of stand off like incidents. Development of Dolha sadia and Bogibeel bridge are a step towards bringing North east in the development map and allow greater flexibility in the security matrix of india.

Conclusion:

In order to fulfil SDG 9, infrastructure development has a strong catalytic role to play in Northeast India. policy responses need to focus on Strengthening infrastructure linkages, Facilitating trade, investment and tourism, Developing human resources and promoting sustainable development in the region is conducive for overall growth and prosperity of the region.

13. Privatisation of railway operations is a progressive economic decision. Comment.

Approach

Students are expected to write about the privatisation and comment on how privatisation of railways operation is progressive economic decisions.

Introduction

Recently, the Indian Railways initiated the process to allow private firms to operate passenger trains on its network through 151 new trains. While these trains will form a minuscule portion of the entire railway network, this marks the beginning of private sector participation in passenger train operations. The privatization of Indian railways has been recommended for many decades, by the erstwhile Planning Commission of India and now by Niti Aayog.

Body

Functions of railway operation department:

- Railway operation encompasses all the activities connected with the running of a railway. However, Operating department in particular has its role in producing a service called Transportation. In this activity, Operating department harnesses the efforts of all the departments of the Railways and optimizes usage of operational assets viz. track, signals fixed installations and rolling stock.
- Railways operating ratio in 2017-18 was 98.44%, worst in 10 years as per CAG. The Railways has also been unable to meet its operational cost of passenger services and other coaching services. Almost 95 per cent of the profit from freight traffic was utilised to compensate for the loss on operation of passenger and other coaching services, it said.

Privatisation of railways operations a progressive economic decision:

- Improved Quality of Services: Operational Efficiency & Passenger Experience Operations of these trains by the private entity will conform to key performance indicators like punctuality, reliability, upkeep of train, catering. Indian Railway services are marred by issues like mismanagement in the form of stinking washrooms, lack of water supply and dirty platforms. Privatisation may solve these issues, as the move would foster competition and hence lead to overall betterment in the quality of services.
- Capacity augmentation: Once the railways permit private players, there is scope for capacity augmentation. This is a very pertinent point because, in 2018-19, 8.85 crore people were on the waiting-list and railways was able to provide reservation to only 16% of the waiting list passengers.
- Improved Security: Private participation can lead to better accountability and monitoring, which can keep a check on rising accidents in railways.

- Attractiveness: The main objective of this move is to introduce a new train travel experience for passengers who are used to travelling by aircraft and air-conditioned buses. Cleanliness in trains, quality of food could be addressed with privatisation.
- Improved Infrastructure: Niti Aayog's strategy for New India @75 envisages many targets in railway infrastructure such as increasing the speed of infrastructure creation from the present 7 km/day to 19 km/day, 100% electrification of broad gauge track by 2022-23. Given this, a strong argument in favour of privatization is that it will lead to better infrastructure which in turn would lead to improved safety, reduction in travel time, etc.
- Technology Infusion: The privatization will also help in accommodating the latest technology in railways coaches, safety and travelling experience. Thereby, it may help Indian Railways to become a world-class network.

From some quarters there is criticism that railways are the common mode of transportation for common man and privatisation of its operations will hampers it's progressive work and goodwill:

- There is criticism that the move to privatise railways will affect the job opportunities of people belonging to the economically and socially backward class.
- Increased Fares: Given that a private enterprise runs on profit, thus it may be assumed that the easiest way of accruing profits in Indian Railways would be to hike fares. This would render the service out of reach for lower income groups. Also, this would defeat the purpose of the Indian railways which is meant to serve the entire population of the country irrespective of the level of income.
- Social Welfare Concerns: As the Indian Railways plays a vital role in transportation of goods in the country, it provides a low cost of transportation of many final and intermediate goods. Thus, the privatization of the system motivated by profit making, will have an inflationary effect and thereby affect the common people.

Way Forward

- Sustainable Pricing: There is a need to revisit Indian Railways pricing model to make the passenger and freight segments sustainable. The tariffs should be competitive with the cost of road transportation.
- Independent Regulator: Setting up an independent regulator will be critical for creating a level playing field for private players. In this pursuit, there is a need to expedite the process of establishing the Rail Development Authority, as it is already approved by the government.

Conclusion

The money which the Indian Railways will earn through revenue sharing can be utilised for improving the quality of passenger train services and railway infrastructure in poorer regions. They should also ensure that all the disputes between the private and public stakeholders are amicably resolved and excellent standards of services to passengers are maintained.

14. What are millets? What are their nutritional benefits? Discuss. Can millet cultivation be a viable solution to agrarian and nutritional challenges? Examine.

Approach

Since question is asking you to Discuss, it necessitates a debate where reasoning is backed up with evidence to make a case for and against an argument and finally arriving at a conclusion.

Introduction

Over the past few years, the healthy food revolution has given way to discover the value of traditional millets. Especially with the increasing health consciousness among people, there has been a rise in the demand of nutrient rich cereals like millets.

Body

WHAT ARE MILLETS?

Millets are cereal crops and small seed grasses, which are widely used in African and Asian countries. Since ages, these small crops were used for human consumption as well as a fodder for animals. Majorly cultivated in the semiarid tropical regions of Africa and Asia, around 97 percent of world's overall millet production happens in these regions.

What are their nutritional benefits?

- Millets are extremely nutritious and good for health and they also need less water and can stored for years, as they have a long shelf life. Millets make for a perfect healthy meal. They are loaded with high amount of starch and proteins, which can be beneficial, if added to the daily diet.
- These little grains are a powerhouse of nutrition, which help in improving heart health and can effectively reduce coronary blockage. It is enriched with the goodness of magnesium, which can effectively reduce blood pressure and risk of stroke and heart attacks.
- Millets are a rich source of magnesium, which help in stimulating the level of insulin, thereby increasing the efficiency of glucose receptors in the body, which further helps in maintaining a healthy balance of sugar level in the body.
- Rich in fibre, millets make for a healthy cereal, which can help in digestion and can relieve bowel issues.
- Millets are loaded with the components such as curcumin, ellagic acid, Quercetin and catechins, which further help in removing foreign agents and free radicals and balance the enzymatic reactions in the body. These can naturally detoxify the blood.

MILLET CULTIVATION AS A VIABLE SOLUTION TO AGRARIAN CHALLENGES

- According to the report of the National Rainfed Area Authority (NRAA) even after realizing the full irrigation potential, about half of the net sown area will continue to remain rainfed. This alarms the need of shifting to the alternative of current cereal staples.
- Millets cultivation can be a solution to this problem as these can grow on shallow, low fertile soils with a pH of soil ranging from acidic 4.5 to basic soils with pH of 8.0. Millets can be a good alternative to wheat especially on acidic soils.
- Rice is very sensitive to saline soils and has poor growth and yield on a soil having salinity higher than 3dS/m. On the other hand, millets like pearl millet (Pennisetum glaucum) and finger millet can grow up to a soil salinity of 11–12 dS/m.
- Millets have a low water requirement both in terms of the growing period and overall water requirement during growth. The rainfall requirement of certain millets like pearl millet and proso millet (Panicum miliaceum) is as low as 20 cm, which is several folds lower than the rice, which requires an average rainfall of 120–140 cm.
- Most of the millets mature in 60–90 days after sowing which makes them a water saving crop. Barnyard millet (Echinochloa frumentacea) has the least maturation time of 45–70 days among millets, which is half to the rice maturation (120–140 days) time.
- Millets fall under the group of C4 cereals. C4 cereals take more carbon dioxide from the atmosphere and convert it to oxygen, have high efficiency of water use, require low input and hence are more environment friendly.
- Thus, millets can help to phase out climatic uncertainties, reducing atmospheric carbon dioxide, and can contribute in mitigating the climate change.

MILLET CULTIVATION AS A VIABLE SOLUTION TO AGRARIAN CHALLENGES

- Millets secure sixth position in terms of world agricultural production of cereal grains and are still a staple food in many regions of world. These are rich source of many vital nutrients and hence, promise an additional advantage for combating nutrient deficiencies in the third world countries.
- Millets are nutritionally similar or superior to major cereal grains. The additional benefits of the millets like gluten-free proteins, high fibre content, low glycaemic index and richness in bioactive compounds made them a suitable health food.
- The mineral content in millets ranges from 1.7 to 4.3 g/100 g, which is several folds higher than the staple cereals like wheat (1.5%) and rice (0.6%).
- Thus, the incorporation of millets in the diet can help to eradicate nutritional deficiencies.

Conclusion

Millets can easily thrive in extreme conditions like drought, and some wild varieties can even prevail in flooded areas and swampy grounds. These have low glycaemic index, abode gluten-free protein and are rich in minerals (calcium, iron, copper, magnesium, etc.), B-vitamins and antioxidants. These extraordinary traits make them nutritious and climate change compliant crops. These can not only serve as an income crop for farmers but also improve the health of the community as a whole. The inclusion of millet-based foods in international, national and state-level feeding programs will help to overcome the existing nutrient deficiencies of protein, calcium and iron in developing countries.

15. Examine the benefits of drip irrigation. Which sort of crops are suitable to be irrigated by this technique? Discuss.

Approach:

Question is very straight forward and simple in its approach students are expected to write about the benefits of drip irrigation in a detailed manner and in the second part mention about which crops are suitable for drip irrigation, then conclude by mentioning prospects and future importance of drip irrigation.

Introduction:

Drip irrigation is sometimes called trickle irrigation and involves dripping water onto the soil at very low rates (2-20 litres/hour) from a system of small diameter plastic pipes fitted with outlets called emitters or drippers. Water is applied close to plants so that only part of the soil in which the roots grow is wetted, unlike surface and sprinkler irrigation, which involves wetting the whole soil profile. With drip irrigation water, applications are more frequent (usually every 1-3 days) than with other methods and this provides a very favourable high moisture level in the soil in which plants can flourish. The main idea behind drip irrigation system is to assist in the growth of agricultural crops and plants by maintaining with the minimum amount of water required, suppressing weed growth in grain fields, preventing soil consolidation etc.

Body:

Benefits of drip irrigation-

- Reduced Water Usage – By directly targeting the root zone, water isn't wasted on areas that won't benefit the plant.
- Healthier Foliage – Overhead watering means the leaves of the plant stay wet long after irrigating. Wet leaves causes discoloring and spotting. With drip irrigation, the plants leaves remain dry.
- Prevents Fungus – Wet leaves can cause fungus such as powdery mildew to spread. Drip irrigation keeps foliage dry and prevents fungus.
- Prevents Soil Erosion – Drip irrigation is a gentle, steady drip and reduces the amount of runoff, therefor reducing soil erosion.
- Reduces Weeds – Since areas in between the plants won't be receiving water, weeds are less likely to grow.
- Nutrient Runoff Minimized – When there's a large volume of water running off the soils surface it depletes nutrients in that soil. Since drip irrigation reduces runoff it reduces the loss of nutrients.
- Doesn't Require Lot of Levelling and Drainage – Typical irrigation setups leave a lot of water on the soils surface. This means drainage and proper site leveling is required to prevent standing water. With drip irrigation this isn't as

necessary since less water is being used and the water is being directed directly to the root system.

- Works With Low Pressure – Low pressure is actually good for drip irrigation. Most overhead irrigation systems require pressure tanks if there are a lot of sprinkler heads.

Suitable crops for drip irrigation technique-

- Drip irrigation is most suitable for row crops (vegetables, soft fruit), tree and vine crops where one or more emitters can be provided for each plant. Generally only high value crops are considered because of the high capital costs of installing a drip system.
- Vegetable plants – Some vegetable plants suitable for the drip irrigation system are Tomato, Chilly, Capsicum, Cabbage, Cauliflower, Onion, Okra, Brinjal, Bitter Gourd, Ridge Gourd, Cucumber, Peas, Spinach, and Pumpkin, etc.
- Cash crops – Some of the cash crops suitable for the drip irrigation system are Sugarcane, Cotton. Areca nut and Strawberry etc.
- Flowers plants – Some of the flower plants suitable for the drip irrigation system are Rose, Carnation, Gerbera, Anthurium, Orchids, Jasmine, Dahilia, and Marigold, etc.
- Plantation crops – Some of the plantation crops suitable for the drip irrigation system are Rubber, Coffee, Coconut, etc.
- Spices – Some of the spices crops suitable for drip irrigation system are Turmeric, Cloves, Mint, etc,
- Oilseeds – Some of the oilseeds suitable for drip irrigation systems are Sunflower, Oil palm, Groundnut, etc.
- Forest crops – Some of the forest crops suitable for drip irrigation systems are Teakwood, Bamboo, etc.

Conclusion:

water scarcity has now reached a new level in India. While severe drinking water scarcity is noticed commonly everywhere, farmers are facing a lot of difficulties in cultivating crops with reduced water availability in different regions. What is worrying is that water scarcity is expected to aggravate further in the near future. Projections made by the International Water Management Institute (IWMI) indicate that one-third of the world population would face absolute water scarcity by the year 2025. NITI Aayog's report (2018) on 'composite water management index' also underlined the depressing state of water stress. There is much scope for easing water scarcity in agriculture. The agricultural sector (irrigation) currently consumes about 80 per cent of water in India, drip irrigation can play an important role in easing the water stress in India its potential in increasing farm productivity also is well known.

16. What are run off river hydropower plants? Are there environmental hazards associated with such plants? Examine.

Approach

We need to define run off river hydropower plants and deliberate on how they impact environment. We need to examine both positive and negative impact of run off river hydropower plants on environment

Introduction

India is committed to have 40 per cent of its installed capacity from non-fossil fuel sources by 2030, and is pursuing a renewable target of 175 GW by 2022 and 450 GW by 2030. Therefore, hydropower is highly relevant for grid integration of renewable energy and for achieving well intended climate and developmental goals.

Body

- Run-of-river hydropower plant channels flowing water from a river through a canal or penstock to spin a turbine. Typically a run-of-river project will have little or no storage facility.
- Run-of-river provides a continuous supply of electricity (base load), with some flexibility of operation for daily fluctuations in demand through water flow that is regulated by the facility.
- The best sites for run of river projects are where there is strong year-round water flow and a large gravitational drop, or hydrostatic head.

Run off hydropower plants are preferred over large dams due to following environmental benefit –

- Lack of a major reservoir reduces the environmental footprint of run of river plants
- Unlike fossil fuel plants they do not emit greenhouse gases.
- Cause less harm to biodiversity.
- Can be built in difficult terrains like Himalayas and other hilly regions
- Provide electricity to population located at distant geographies.

In recent years, run-of-the-river hydropower projects have emerged as a viable, low-impact alternative to existing large-scale projects, India has number of ROR hydroelectric power stations such as Baglihar Dam, Nathpa Jhakri and Shringar Hydropower Station, Ratle Hydroelectric Plant, Maheshwar Hydropower Plant and Kishanganga Hydroelectric Plant are under construction.

However, run off river hydropower plants are associated with following environmental hazards:

- They often cause drops in water flow and changes in water temperature which in turn drive declines in fish populations.
- Access roads and transmission lines cause habitat fragmentation and destruction
- Stretch of river in between diverted point and re-joining point suffers from water depletion and loss of vegetation.
- Increase sedimentation in the river.
- Negatively impact the land and river ecosystem.

Conclusion

While there are good reasons to argue that the environmental impact of run of river plants is small compared to many alternatives, it is important to balance the negative impacts of such plants and ensure a sustainable source of energy for India with a population of 1.4 billion and one of the world's fastest-growing major economy.

17. What are the challenges related to procurement, storage and transportation of agricultural produce in India? Analyse.

Approach

Students are expected to write about agriculture sector in India and its weightage in India's economy and analyse about the challenges related to agriculture in procurement, storage and transportation.

Introduction

India's agriculture sector plays a crucial role in Indian economy. Over 58 % of rural-households depend on agriculture as their primary means of livelihood. Along with fisheries and forestry agriculture is one of the largest contributors to nations GDP.

Body

The 7500+ Agricultural Procurement and Marketing Committee (APMC) mandis provide a marketplace for the transaction and the Food Corporation of India (FCI) plays the role of the buyer, storing the procured produce in the relevant warehousing corporation's warehouse.
Challenges related to procurement, storage and transportation:

- Flawed Agricultural Marketing Policies: Due to restrictions imposed by Agricultural Produce Market Committee Acts passed by various states, Indian farmers today can only sell their produce at Farmgate or local market (haat) to village aggregators, APMC mandis and to government at the minimum support price (MSP).
- Limited reach of mandis: Also, this procurement system has failed to cover the entire country evenly back of the envelope calculation suggests that on an average, a farmer needs to travel 12 kms to reach the nearest mandi and more than 50 kms in NE India while according to the recommendations by National Farmers Commission, availability of markets should be within a 5 km radius.
- Procurement problems: Almost 2/3rd of the total cereal production is taken through the route of MSP, leaving only 1/3rd for open market. Hence, farmer can't take benefit of market prices and has to depend solely on the MSP. It prevents the farmer from earning of profits.
- Too many intermediaries, information asymmetry: The above mentioned problems have led to formation of long marketing channels, with multiple intermediaries, adding to the woes of the producers of perishable agri goods. These intermediaries have led to a cost inflation of 250% (over the cost of production) and have exacerbated the existing information asymmetries in agriculture, especially for non-MSP crops.
- Inadequate infrastructure for storage: As per agriculture survey has recently estimated the gap between agri-warehousing supply and demand at 35 mn MT. Currently, public sector agencies like the FCI, Central Warehousing

Corporations (CWC) and the various State Warehousing Corporations (SWC) have a storage capacity of 71 mn MT, while the private sector has close to 25 mn MT.

- Inefficient price signals: The government has been buying almost one-third of all rice and wheat produced in India through the PDS system, but in other kinds of grains, fruits and vegetables (both being highly perishable), the role of the government is limited. This leads to MSPs being ineffective as both price signals and as insulators from the perspective of the larger agricultural population.
- Skewed distribution of capacity: Skewed distribution of this capacity is another issue, with North India having access to 60% of the total storage infrastructure. Different survey has recently estimated the gap between agri-warehousing supply and demand at 35 mn MT.
- Lack of cold storage infrastructure: India's current cold storage capacity at 25 MT is barely sufficient for 10% of fruit and vegetables produced in the country.

Indian farmers incur Rs 92,651 crore per year in post-harvest losses, the primary causes of which are poor storage and transportation facilities according to the high-level Dalwai committee report. Therefore various steps to tackle the challenges and wayforward are:

- The post-harvest losses can be substantially reduced if they are shifted to trains and flights for example recently government announced Kisan rail and Kisan udaan scheme.
- Reducing the information asymmetry with high mobile Internet penetration in rural India, Reuters Market Light and Fasal Intuit are working on the problem of information asymmetry for agricultural producers, by making personalized agricultural market information available to the farmers.
- Alternate marketplaces ayoung innovative company, eFarm, is providing a way to bypass the long chain of intermediaries by directly connecting buyers and sellers of agricultural produce.
- NITI Aayog is working on alternative mechanism. A counterpart of the MSP is the Market Intervention Scheme (MIS), under which the state government procures perishable commodities like vegetable items.
- Integrated cold chain solutions with PM SAMPADA and ColdStar Logistics provides customized solutions for cold storage and refrigerated transportation across India for fresh and frozen commodities.
- To provide an alternative, the government aims to set up 10,000 new Farmer Producer Organisations by 2023-'24 to encourage farmers to come together as shareholders to increase production and to market their crops more effectively. The finance ministry has set aside Rs 1 lakh crore to disburse easy loans to these Farmer Producer Organisations.

Conclusion

Farmers' income can improve substantially if they are able to capture a greater share in the supply chain from farm gate to consumer. For this to happen, farmers must

have the freedom to sell what they want, where they want, and when they want without any restrictions on sale, stocking, movement, and export of farm produce.

18. Examine the distorting impact of agricultural subsidies. What reforms are needed to streamline the subsidy regime in India? Discuss.

Approach:

Question is straight forward in its approach students are expected to explain the distorting impact if agricultural subsidies in India with proper examples also explain how to streamline the subsidy regime to lower the burden on exchequer and then arrive at a well balanced, logical and forward looking conclusion.

Introduction:

Agriculture in India is the most important segment of the economy. Growth of Agricultural sector is crucial for Indian economy as it employs two-third of its population and contributes nearly one-third of national income. However its importance in the economic, social and political fabric of India goes well beyond what is indicated by its contribution to the economy. The large number of poor agricultural households and their income vulnerability are major concern among policy makers. These concerns have driven both agricultural policies and public expenditures in agriculture in India as well as in other part of the globe. Agriculture is also one of the major sources of export earnings of our country and is crucial for improving the balance of payments. In recent years, the export of agricultural and allied products accounted for about one-fifth of total export earnings of India. India's share of agricultural export has remained very low in many commodities despite inherent strength of Indian agriculture with the exception of few commodities.

Body:

Introduction of the High Yielding Varieties (HYV) seeds programme in the 1960s demanded a high priority to supplying irrigation water and fertilisers to the farmers, the government tried to ensure that they were accessible and affordable. Subsidy on fertilisers is provided by the Central government whereas subsidy on water is provided by the State governments. Government gives different types of subsidies to farmers like, fertilizer, irrigation, equipment, credit subsidy, seed subsidy, export subsidy etc.

Distorting impact-

- Subsidies directed by the United States government, particularly to corn farmers, can have a spill over affect in developing countries like India. Subsidies granted to the farmers of developed countries are way higher than that given to Indian farmers, thus it can cause distortion to the domestic market of domestic markets as well.
- Fertilizers subsidy, as an input for agriculture production, is responsible for rampant use of fertilizers, commonly the triad NPK, in India. This acts as a barrier for entry to the developed market like European Union who held that India’s agricultural products are not up to the mark of WTO’s phytosanitary measures.

- While the developing countries like India and China are not in an affordable position to breach the de-minimus level of Aggregate measures of support(AMS), developed countries like US provides subsidies exceeding 50% in some products such as Canola, cotton, sugar and more than 200% for wool.
- Most benefits of subsidies are allotted to big farmers while In India, 2/3 rd farmers are marginal farmers which can't utilize the benefit of subsidy properly. Thus the value of produce of such farmers decrease.
- It leads to overproduction of one crop(grains) over other(like fruit, pulses). Thus sometimes grains are piled up for rotting in warehouse. Also in market, the trade of such cereals take place on the expanse of other non- subsidised products.
- Groundwater is the dominant source of irrigation and it has expanded rapidly since the 1970s. Since electricity is used to pump water from underground aquifers, electricity use in agriculture and the number of electrified pumpsets have also increased rapidly. In 1979/80, the number of electrified pumpsets was a little less than 4 million. By 2017/18, the number had jumped to more than 21 million. The share of agriculture in electricity supply was negligible in the early 1970s. The low and flat tariff structure of agricultural electricity supply is a plausible reason for excessive groundwater extraction although it is not probably the only or even the major factor. Other reasons such as price support policies that make water-intensive crops attractive.
- Agricultural Finance: Farmers are entitled to pre- harvest loan at 7% interest rate.They are allowed further 3% subvention in case of timely payment. Farmers can also take loan for post-harvest time against negotiable warehouse receipt. Economic survey notes three discrepancies in this subsidy. One, trend indicates that amount for a single loan is increasing for most of these subsidized loans. This means that more subsidies is going in favor of rich farmers. Two, extension of subsidized credit is concentrated in last three months of the financial year, which indicates that reluctant banks otherwise unable to meet priority sector lending targets, desperately disburse loans to reach target at the end only. It is unlikely that this way credit will reach to desirable party. Third, agriculture credit is getting concentrated on peripheries of urban areas, which means that money is being diverted to nonagricultural use.

Reforms to streamline subsidy regime in India-

- Pursuing Cooperative Federalism: Agriculture is a State subject in the Constitution, listed as Entry 14 in the State List (List II). Apart from this, entry 26 in List II refers to "trade and commerce within the State"; entry 27 refers to "production, supply and distribution of goods"; and entry 28 refers to "markets and fairs" For these reasons, intra-State marketing in agriculture was always considered a legislative prerogative of States. Therefore, any reform pertaining to agriculture and farmer's income must come up after consultation with the states.
- Changing the Pricing Mix: Government must come up with a suitable transition to agricultural pricing policy, whereby partial agricultural pricing

should be state-supported and partially market-driven. One way to do this, could be a deficiency payments scheme along the lines of the Bhavantar Bhugtan Yojana (BBY) initiated by Madhya Pradesh. In this scheme, the government rather than procuring from farmers, compensates farmers with cash transfers when the market price falls below MSP.

- Strengthening FPO: With the changes brought the recent farm legislation, it is expected that many companies will be encouraged to build efficient supply lines somewhat on the lines of milk. However, there is a genuine demand for protection of farmers from ruthless market orientation for Profit. Thus, there is a need for strengthening of Farmers Producer Organisations (FPOs), this will increase bargaining power of farmers on one hand and provide a suitable investment climate on the other.
- Direct Benefit Transfer (DBT) in Fertilizers: DBT scheme can bring benefits to the farmer on various fronts; choice of improved products at competitive rates, gain from enhanced extension services from the industry on best practices leading to "sustainable and responsible" agriculture production, and better earnings for such produce.
- Enabling Last-Mile Connectivity: Affordable and workable" last mile" technologies can enable the Government to set up the required framework for disbursal, which in turn will allow for focused targeting of subsidy based on land, crop, soil health and other geographical factors. In order to address the imbalance in the fertilizer use, urea has to come under NBS.

Conclusion:

Agriculture lies at the backbone of Indian economy. Therefore, more sustainable solutions lie in augmenting productivity, diversifying to high-value crops, and shifting people out of agriculture to the high productivity sector. Subsidies are meant for poor people and they shall ensure equitable redistribution of resource. Subsidies extended to rich are regressive. They help in keeping poverty intact and create inefficiencies in economy which culminates in inflation and corruption. In such case economy is retarded as we have seen in India's case. When India grew in first decade of millennium at average rate of 7.5% it was found that this growth was jobless and unsustainable. India's economy faced supply side constraints, which didn't increase productivity as compared to GDP. RBI had to then control spiraling inflation by steep hikes in interest rates. Rationalization of subsidy regime will improve markets in India which will then attract more investment. This in short, can turn the wheel of a virtuous economy which creates more employment and attacks poverty at its roots.

19. What role does IT play in agricultural growth? Discuss with the help of suitable examples. What can be the next possible frontiers for IT in the field of agriculture? Examine.

Approach

Candidates are expected to write about Information technology as potential tool for agriculture and how application of IT will play a role in agriculture growth with suitable examples. Also highlight on few next possible IT enabled technology which can enhance the field of agronomy and increase the productivity of agriculture.

Introduction

Information technology and agriculture, both were considered incongruous to each other a decade ago, but now the scenario has changed. Today, information system is being widely incorporated with agriculture. Information technology always had the potential to increase the quality of farming and farming products. The WTO has recently made a laudable effort in promoting the information technology as an integral part of farming sector around the world.

Body

Role of IT in agriculture growth:

- E-Agriculture is a new area of knowledge emerging out of convergence of IT and farming techniques. It enhances the agricultural value chain through the application of Internet and related technologies. Basically IT helps farmers to have better access to information which increases the productivity. It also enables get better prices through information of change in price in different markets.
- Soil Management, Water Management, Seed Management, Fertiliser Management, Pest Management, Harvest Management and Post-Harvest Management are the important components of e-Agriculture where information technology aids farmers with better information and alternatives.
- The E-Agriculture is part of Mission Mode Project, which has been included in NeGP (under National E-governance Plan) in an effort to consolidate the various learnings from the past, integrate all the diverse and disparate efforts currently underway, and upscale them to cover the entire country.
- For example it uses a host of technologies like Remote Sensing, Computer Simulation, Assessment of speed and direction of Wind, Soil quality assays, Crop Yield predictions and Marketing using IT.
- Mobile is playing a big role in monitoring and controlling crop irrigation systems. With the right equipment a farmer can control his irrigation systems from a phone or computer instead of driving to each field.
- Moisture sensors in the ground are able to communicate information about the level of the moisture present at the certain depth of the soil. GPS enabled

services are helping in field documentation about yield, moisture, maps for field drainage, etc.

- Site specific crop management (SSCM) i.e precision agriculture is a farming management concept. This technique focuses on utilising resources optimally to improve the quality and quantity of crops while lowering the cost of production.
- For example Uzhavan app, Ag mobile, CCMobile app, IFFCO Kisan are some of the applications developed keeping in mind the need of the hour requirements in farming. Several notable initiatives like e-choupal, Agri market, Kisan Suvidha and the more recent e-NAM had long been trying to place agriculture as the forerunner.

IT has the potential to transform agriculture into a better prospect in the wake of climate change and decrease in the cultivable land let us examine next possible frontiers for IT in the field of agriculture:

- Computer-controlled devices or automated systems. For example, automated milking systems that milk the dairy cattle without human labor. This way, farmers can save time for supervisory duties.
- RFID (Radio-frequency identification) allows easier identification and provides to data, such as bearer's location, name of breeder, origin of livestock, sex, and dates of movement. Also, RFID technology will provide improvements in controlling disease outbreaks in livestock.
- Digital Mandi App helps to check the latest Indian agricultural commodities mandi price from different states and districts. It simplify for farmers, traders and for every Indian citizen to know the mandi and trade.
- IMD and ICAR in collaboration with the different institutions like agricultural universities, there inter-institutional collaboration could be further strengthened in the field of agro-meteorological activities.
- National Mission on Agricultural Extension and Technology (NMAET) aims to plan interactive methods, using information and communication technology (ICT), which includes messaging services, web-based applications, capacity building, institutional strengthening, encouragement of public-private partnership and training services to guide farmers.
- With the new extension of ITC initiatives like Krishivihar, i-Kisan,e-kutir, e-Sagoo, ICT models- AGROWEB, Agropedia, AgrInnovate, etc. Indian agriculture has come to a long way and established several records in terms of production and productivity.

Challenges in India for adopting IT initiatives:

- In rural areas, insufficient connectivity, along with lack of basic computer knowledge, high costs for services and literacy hinder rapid development of electronic-agriculture.
- Despite the visible benefits of the new agricultural technologies, farmers either do not adopt them or it takes a long time for them to begin the adoption process and scaling up.
- Rich farmers are adopting the technology and utilizing their services but the small and marginal farmers are unable to afford the new technologies and they remain left out.

Conclusion

ICTs are changing all the spheres of human lives and agriculture cannot be an exception. It may act as an agent for changing agrarian and farmer's life by improving access of information, linking farmer with big markets, consumers and sharing knowledge. However, these technologies are pretty expensive, thus, government should strive to make it affordable and accessible with targeting digital divide so that farmers feel empowered and can adopt for substantial upliftment and sustainable development.

20. What do you understand by buffer stock? What are the policies related to the maintenance of buffer stocks in India? Discuss.

Approach

The candidate needs to address the question in two parts where the first part explains the concept of buffer stock and the second part discusses the policies related to the maintenance of buffer stocks in India.

Introduction

Buffer stock refers to a reserve of a commodity that is used to offset price fluctuations and unforeseen emergencies. Buffer stock is generally maintained for essential commodities and necessities like food grains, pulses etc. In context of Indian agriculture, it is the minimum food grains the Centre should have in the Central pool at the beginning of each quarter to meet requirement of public distribution system and other government schemes related to food grains.

Body

- State-run Food Corporation of India (FCI) is the responsible agency to maintain buffer stock limits in India. As per recent reports, FCI held food grain stock that is 2.7 times more than the required norms as on January 1 2021.
- The concept of buffer stock was first introduced during the 4th Five Year Plan (1969-74). Buffer stock of food grains in the Central Pool is maintained by the Government of India (GOI) / Central Government for –

1) Meeting the prescribed minimum buffer stock norms for food security,
2) Monthly release of food grains for supply through Targeted Public Distribution System (TPDS) and Other Welfare Schemes (OWS),
3) Meeting emergency situations arising out of unexpected crop failure, natural disasters, etc., and
4) Price stabilisation or market intervention to augment supply so as to help moderate the open market prices.

- The Cabinet Committee on Economic Affairs fixes the minimum buffer norms on quarterly basis: i.e. as on 1st April, 1st July, 1st October and 1st January of every financial year.
- At present, GoI prefers to use the term - Food grain stocking norms - which refers to the level of stock in the Central Pool that is sufficient to meet the operational requirement of food grains and exigencies at any point of time. Earlier this concept was termed as Buffer Norms and Strategic Reserve.
- The current buffer norms were reviewed in January 2015. According to the new norms, the central pool should have 41.1 million tonnes of rice and wheat on July 1 and 30.7 million tonnes on October 1 every year. These limits were 32 million tonnes and 21 million tonnes earlier.

- Main drivers for increased buffer stocks were increased off take from the targeted public distribution system and also enactment of National Food Security Act. But then it also needs to maintain an excessive, incontrollable and monetarily troublesome food inventory.
- Previously, once the buffer norms were met, cabinet approval was needed to sell any part of it in the open market. But in January 2015, it is revised. The current policy is that Food Ministry is authorized to dispose the surplus stock into open market without seeking cabinet approval.
- This was a major policy decision and it was needed to resolve the problem of burdensome inventories at Food Corporation of India and misrepresentation created in market.
- The maintenance of a buffer stock is also important to ensure national food security. Stocks mainly of rice and wheat are commonly maintained from year to year at a substantial cost in order to effectively take care of variations in domestic food grain production.
- The buffer stock policy helped India in COVID times where the government had decided to give three months' ration in advance free, plus one kg of pulses per family. This helped in combating the menace of hunger during the pandemic induced lockdown.

Way Forward –

- Incorporating the recommendation of Shanta Kumar High Level committee to improve the operational efficiency and financial management of FCI.
- The coronavirus crisis has shown how digital technologies can make supply chains functional and resilient. New technologies could facilitate the supply-demand interface, which would greatly help perishable goods.
- Supportive actions for e-commerce and delivery companies will strengthen agro-supply chains. Governments can also initiate mobile procurement of crops with the help of the National Agricultural Cooperative Marketing Federation of India (NAFED).
- Access to farm machinery can be improved by making the inventory available at block or sub-district levels. The launch of Kisan Rath app is proving to be a boon; 1.5 lakh farmers and traders have already registered to avail the app's services.
- Further, Ashok Gulati suggests that a cash pay-out would still be been a better option than a grain pay-out, which is also seconded by NITI Aayog.

Conclusion

There is a need for evaluation and rationalisation of buffer stock management policy so as to reduce the burden on the central and state exchequers and to promote efficiency in the system. Involving private players in the same will create greater competition, promote the desired efficiency and growth in the ecosystem, which is the ideal also sought through the recent farm acts.

21. What are the factors responsible for regional variations in food and nutritional security in India? Examine.

Approach

Candidates are expected to write about what is food and nutritional security in introduction and then in body part shortly address the current situation in India and examine the factors responsible for regional variation in the food and nutritional security in India.

Introduction

Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.

Body

Food and nutritional security in India:

- Despite historically high levels of food production in India, undernutrition and micronutrient deficiencies persist. At present, 22.5 percent of adults are underweight, and 38 percent are still stunted.
- While undernutrition persists, based on the latest data from the National Family Health Survey-4, more than 20 percent of Indians are overweight or obese. India joins many other countries in grappling with the double burden of malnutrition. Overweight and obesity rates have doubled over the past decade in all Indian states, registering rapid growth in both rural and urban areas.
- India ranked 94 among 107 countries in the Global Hunger Index 2020 and is in the 'serious' hunger category with a score of 27.2, India's rank was 102 out of 117 countries last year.
- The economic disruption caused by pandemic & the lockdown is still unfolding. Supply chains are disrupted especially the ones related to food for example children out of school who were previously benefited from mid day meal scheme.

Factors responsible for regional variations in food and nutritional security in India:

- India exhibits considerable heterogeneity in geography, climate, infrastructure, production structure and socio-cultural development; and inter-state variation in income growth due to significant differences in such structural characteristics across states intensify the regional differences in food and nutritional security.
- Despite its success, the Green Revolution is often criticised for being focused on two cereals, wheat and rice which impacts nutritional diversity being

confined to a few resource abundant regions in the northwestern and southern parts of the country.

- The Green Revolution was followed by the White Revolution, which was initiated by Operation Flood during the 1970s and 1980s was mainly revolutionised in western part of few Indian states.
- Lack of coherent food and nutrition policies in few states. Deserving beneficiaries of the subsidy are excluded on the basis of non-ownership of below poverty line (BPL) status, as the criterion for identifying a household as BPL is arbitrary and varies from state to state. Besides this, low quality of grains and the poor service at PDS shops has further added to the problem.
- Food security adversely affected with availability and expansion of irrigation facilities, improvement in agricultural technology and overall food grain output.
- Climate change too, has an impact on the agricultural productivity, which affects the availability of food items and thus, food security. Major impact of climate change is on rain fed crops growing region other than wheat and rice growing region.
- Agro-climatic diversity with rain shadow region and influence of climate variability on yields at regional scales affects the food and nutritional security. And a complex interplay among rainfall, temperature and cropping choices, with a drought-prone region in India impacts vastly on food security.
- Tribal communities in tribal part of India due to there habitation in remote difficult terrains and practice of subsistence farming has caused significant economic backwardness and food insecurity that led to malnutrition among the tribals children.
- The emergence of rural origin pockets in the urban region has resulted in a number of slum settlements characterised by inadequate water and sanitation facilities, insufficient housing and increased food insecurity.
- Ironically, around 50 % of the urban slums are not notified and thus are deprived of the government schemes. People from these un-notified slums have to buy their food from the common market at the competitive price and are devoid of the subsidised food made available through Public Distribution System (PDS).

Measures to be Taken to Ensure Food and nutritional security:

- Improved inputs like irrigation facilities, availability of better quality seeds, fertilisers and credits at lower interest rates. Also focus mainly on rationale distribution of cultivable land, improving the size of the farms.
- Higher profitability and stability in production highlight the importance of crop diversification, e.g. legumes alternative with rice and wheat. Growing of non-cereal crops such as oilseeds, fruits and vegetables etc need to be encouraged.
- Working towards Blue Revolution Sea, lakes and rivers can be used to provide food and nutrition. Fish are a very good source of protein and do not require good soil.
- Existing direct nutrition programmes should be revamped to enable management by women's Self Help Groups (SHGs) and /or local bodies along

with orientation and training of community health workers, Panchayati Raj Institution (PRI) members, other opinion leaders, caregivers and other stakeholders can be another area.

Conclusion

The right to food is a well established principle of international human rights law. It has evolved to include an obligation for state parties to respect, protect, and fulfil their citizens' right to food security. India needs to adopt a policy that brings together diverse issues such as inequality, food diversity, indigenous rights and environmental justice to ensure sustainable food and nutritional security.

22. How do cycles of inflation affect the common farmers in India? Illustrate. What strategies would you suggest to protect farmers from price fluctuations?

Approach- Candidate is required to outline the factors responsible for inflation and its subsequent effects on farmers. In the second part, strategies can be given for balancing price volatility.

Introduction

India is experiencing high rate of economic growth in the last two decades but the growth has been coupled with high rate of food price inflation. The growth has been very uneven across sectors with agriculture remaining very sluggish.

Body

How inflation hits income of farmers?

- Inflation raises prices for farm inputs as well as farm products, resulting in uncertain effects on the current net incomes of farmers. Inflation may benefit people with flexible money incomes but not those whose money incomes are fixed.
- Farmers have flexible money incomes. Therefore, theoretically at least, they should benefit from an unanticipated increase in the rate of inflation. Empirical studies however, have not found this connection, the NCAER study said.
- As inflation increases, prices paid by farmers for various inputs increase faster than the prices they receive for their products, thereby the terms of trade for farmers deteriorate as the rate of inflation rises.
- On the other hand, higher marketing margins due to imperfections in the agricultural markets, stirred up by higher wages and various other marketing costs, reduce the demand for farm output at the farm level.
- These opposing forces suggest that the net impact of inflation in the national economy on prices received by farmers is small in comparison to the impact on prices paid.
- Also the inflation targeting in India has adverse effect on food prices. Since food items have a large weight in the consumer price index, any effective strategy of inflation containment seeks to keep food prices low. This is sought to be achieved through measures that keep farm-gate prices low.
- The fear of inflation rising to an arbitrarily set number is used as a justification to implement austerity.
- These penalize the agricultural sector by leading to a reduction in subsidies and a decline in investment, both of which contribute to raising input costs. The real cost of inflation-targeting is therefore borne by farmers, who are deprived of remunerative prices.
- The low current income from farming motivates farmers to seek higher support prices and to extend price support policies to more commodities. Such policies result in further higher prices and higher rates of inflation.

- The high input prices lead farmers to take recourse to more credit, especially non-institutional credit for their farm operations which ultimately leads farmers into a debt-trap, the study said.

What can be done?

- India could wipe out $49 billion from its GDP if global food prices double, says new research by the United Nations Environment Programme (UNEP) and the Global Footprint Network.
- The next global food shock will be created by the lethal combination of rising consumer demand and fluctuating supply, thanks to climate change, water scarcity and environmental degradation. And it will likely result in India's GDP dropping 2.4%, the consumer price index (CPI) rising 13.8% and the sovereign credit rating plummeting by three notches.
- There is need to ensure that the government lets farmers benefit from the free play of markets. In other words, when prices rise, let farmers benefit from it instead of, say, arbitrarily imposing an export ban or allowing cheaper imports to cushion the blow on consumers.
- the need to create supporting infrastructure that allows farmers to avoid making distress sales. Adequate and efficient warehousing can be a game-changer.
- By not letting greater free play of the market degenerate into an unregulated and exploitative regime. Let there be structures that provide timely regulation of trade outside mandis and allow for effective grievance redressal mechanisms will benefit farmers.
- More needs to be done with regard to contain impact of climate change on agriculture. With more investments and robust infrastructure this can be achieved to gain most of the benefits for farmers.

Conclusion

The new farm reform laws and optimum inflation targeting will be in favour of farmers and will act against the price volatility. India is one of the worst performer on global hunger index, so we need to feed billion mouths and at the same time, we have to ensure that the annadata gets maximum benefits and not adversely affected.

23. Examine the ways through which food is made accessible and affordable to the masses in India? What are the challenges in this regard? Discuss.

Approach

As the derivative is discuss so it necessitates a debate where reasoning is backed up with evidence to make a case for and against an argument and finally arriving at a conclusion.

Introduction

India has been ranked 94th in a list of 107 countries on the Global Hunger Index, released a fortnight ago. It's behind Nepal (73rd), Bangladesh (75th) and Pakistan(88th). But food production has not been a problem in India. The problem is economic access (whether people can afford food) and physical access (whether it is reaching them).

Body

THE WAYS THROUGH WHICH FOOD IS MADE ACCESSIBLE AND AFFORDABLE TO THE MASSES IN INDIA

- In India, food and nutrition security for the poor deserves special attention, particularly amidst the COVID-19 pandemic.
- Companies in India play an important role in ensuring the accessibility and affordability of healthy products; for example, by not increasing the price of healthier products despite the economic shocks of COVID-19.
- Most people in India depend on markets for food acquisition, especially among the poorest wealth quintiles, for whom landlessness is common and farm sizes are small, making these households 'net consumers' of food.
- A wide range of policies – including input subsidies, public food distribution and price controls have increasingly tried to address food and nutrition insecurity through reforms to food and nutrition assistance programs and social protection schemes - such as the Midday Meals Scheme in government and government-aided schools and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) that guarantees 100 days of employment per year to every rural household.
- However, whether India's food system is delivering adequate affordable and nutritious foods has remained understudied.

THE CHALLENGES IN THIS REGARD

- Supply chain disruptions can cause food price rises, increasing the overall cost of nutritious foods, making a healthy and diverse diet less affordable.

- Without policies that promote access to and availability of nutrient-rich foods, much of the country is left with diets high in either nutrient-poor grains or fattening processed foods.
- In India, for decades, the Minimum Support Price and public procurement policies have ignored the diversity of crops and skewed in favour of staples such as rice and wheat. The enhanced production of these food crops might have taken care of the calorie requirements, but the double burden of under-nutrition and micro-nutrient deficiency has risen further.
- Diets are highly inaccessible and unaffordable, especially for women hence greater focus is needed on enhancing inaccessibility and affordability of nutritious food groups.

Conclusion

Achieving nutritional security in India requires a much more holistic focus on improving the affordability of the full range of nutritious food groups (not just cereals), a reappraisal of social protection schemes in light of the cost of more complete nutrition, ensuring that economic growth results in sustained income growth for the poor, and more timely and transparent monitoring of food prices, incomes and dietary costs. Post-COVID-19 pandemic is the right time to seize the opportunity and push policies that promote nutritious and sustainable food systems and value chains and create adequate demand for healthy, nutritious, qualitative and safe food, through consumer behaviour change.

24. How is rural society integrated with the livestock economy in India? Explain with the help of suitable examples.

Approach:

Question is straight forward in its approach students are expected to explain the above question with the use of examples to explain the points properly.

Introduction:

Livestock sector contributes around 28% to agriculture GDP of the country which is more than food grains and 5% to overall GDP. India has world's largest no of buffalo and second largest no of cattle and goats. About 20.5 million people depend upon livestock for their livelihood. It also provides employment to about 8.8 % of the population in India. Livestock plays an important role in Indian economy. India has vast livestock resources. Livestock sector contributes 4.11% GDP and 25.6% of total Agriculture GDP.

Body:

HOW IS RURAL SOCIETY INTEGRATED WITH THE LIVESTOCK ECONOMY IN INDIA

- Livestock contributing 16% to the income of small farm households as against an average of 14% for all rural households, livestock provides livelihood to two-third of rural community. It plays crucial role in rural development as gives additional income, living banks for rural families and is also crucial in benefitting the women, illiterate and unskilled people of rural society.
- The rural women play a significant role in the rearing of livestock and are responsible for most of the operations relating to feeding, breeding, management and health care of the livestock. The rapidly increasing demand for livestock products creates opportunities for the empowerment of women.
- when 90% farmers are small and marginal, livestock as an allied activity assumes important role to provide livelihood in rural areas and drive Indian economy towards development.
- Livestock improves food and nutritional security by providing nutrient rich food products, generate income and employment and act as a cushion against crop failure, provide draught power and manure inputs to the crop subsector and contribute to foreign exchange through exports
- Diversification of income and employment portfolio is crucial for sustainable rural livelihoods. Livestock sector can play an important role in poverty alleviation, income enhancement and risk reduction for poor rural households.
- Livestock is one of the fastest-growing subsectors of agriculture and allied activities.

- Dalit or Scheduled Caste (SC) households, being at the lowest rung of social strata, is one of the most socially marginalised, resource-poor and economically vulnerable groups in India.
- Rural Poverty is largely concentrated among the landless and the marginal households comprising about 70 percent of rural population. livestock rearing has significant positive impact on equity in terms of income and employment and poverty reduction in rural areas. Livestock generates a continuous stream of income and reduces seasonality in livelihood patterns particularly of the rural poor.
- A large number of people in India being less literate and unskilled depend upon agriculture for their livelihoods but agriculture being seasonal in nature could provide employment for a maximum of 180 days in a year. The landless and small farmers having less land holdings depend upon livestock sector during lean agricultural season. Around 70 percent of the population living in rural areas depend on agriculture and allied activities for livelihood hence, there is a need for a subsidiary occupation like poultry, sheep and goat farming.

Conclusion:

Livestock helps in women empowerment and provides livelihood to many marginal farmers. Both the national economy as well as the socio-economic growth of rural India is backed by the livestock sector. So, in general we can clearly mention that the role of livestock is immortal and immense in today's scenario and in the coming future. It is going to pump up the socio- economic status of the rural families and hence secure the national food and economic security. Livestock is already catering the various employment opportunities and the day is not far when livestock will be an essential asset for every agricultural farmer.

25. Integration of food processing into the agricultural production cycle will help achieve the target of doubling farmers' income. Do you agree? Substantiate.

Approach:

Students are expected to write about how integration of food processing into agricultural production cycle will help in doubling famers income and substantiating the same with proper examples and it is also important to mention the issues in the process of integration as well.

Introduction:

Food Processing includes process under which any raw product of agriculture, dairy, animal husbandry, meat, poultry or fishing is transformed through a process (involving employees, power, machines or money) in such a way that its original physical properties undergo a change and the transformed product has commercial value and is suitable for human and animal consumption. It also includes the process of value addition to produce products through methods such as preservation, addition of food additives, drying etc. with a view to preserve food substances in an effective manner, enhance their shelf life and quality. The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.80 and 8.39 per cent of Gross Value Added (GVA) in Manufacturing and Agriculture respectively, 13 per cent of India's exports and six per cent of total industrial investment. The Indian gourmet food market is currently valued at US$ 1.3 billion and is growing at a Compound Annual Growth Rate (CAGR) of 20 per cent. India's organic food market is expected to increase by four times by 2022.

Body:

Current status of food processing industry in India-

- India is the world's second largest producer of fruits & vegetables after China but hardly 2% of the produce is processed. In spite of a large production base, the level of processing is low (less than 10%). Approximately 2% of fruits and vegetables, 8% marine, 35% milk, 6% poultry are processed. Lack of adequate processable varieties continues to pose a significant challenge to this sector.
- India's livestock population is largest in the world with 50% of the world's buffaloes and 20% of cattle, but only about 1% of total meat production is converted to value added products.
- Agricultural produce is an important factor for sustaining food processing activities. Due to seasonal availability of certain crops, the sector faces delays in production resulting in low supply.

- For oil production, the majority of oilseed producers are small and marginal farmers with poor access to resource bases such as fertilizers, manure, etc. Hence, oilseeds grown by such farmers have low yield.
- Rabi crops like wheat, barley and mustard are sown around mid-November and harvested in April or May. These food grains are dependent on forces of nature, which are rather unpredictable.
- Seasonal scarcity and high cost of raw materials constitutes one of the major constraints affecting the growth of small-scale food processing enterprises. This scenario results in scarcity and higher pricing of raw materials.

How will integration help in doubling farmers income-

- Since doubling of income will warrant high growth rate of production year after year, there would a need for robust post-production activities and hence' investment in storage and transportation' inducing cold chain logistics and food processing. This will reduce post-harvest losses in high value crops such as fruits, vegetables, fish, etc. How to reduce post-harvest losses in high value crops is an important issue. Wastages in fruits, vegetables, fish, etc.need to be reduced by creating storage, cold chain, and market infrastructure.
- Farmers' inclusive growth would require a shift fromproduction-based agriculture to profit based farming. Small and marginal farmers, who constitute around 85 per cent of total farming population are last to reap the benefits of agro-based enterprises; as they end up fighting distress sale and post-harvest losses. The farm harvest price i.e. average wholesale price at which the commodity is disposed off by the producer to the trader at the village site during the specified harvest period provides us a clear picture of farmers' condition.
- Agro processing generates employment opportunities within sector and more opportunities in service sector. Agro processing centre (APC) in the production catchment has twin obvious advantages of enhanced income through value addition to the farm produce and reduction in post-harvest losses as a means to provide gainful rural employment. These APCs consist of two or more machines for processing at farm/village level. However, the requirement of machinery depends upon the crops to be processed, level of processing and scale of processing.
- Small farmers will be associated and incentivised to form commodity groups/processor companies for better earning profits. Women can be given training in the area of processing and can go for value addition through mango pulp processing, guava products processing such as guava leather, guava nectar and various carbonated and fresh fruits beverages.
- Integration of agricultural cycle with food processing industry will increase demands of agri produce thus ensure the enhanced income to farmers.
- It will also enable farmers to go for contract farming which will ensure continuous and non disrupted supply throughout the year thus will save them from fluctuating market prices.

- It will incentivise farmers to go for integrated and mixed farming approach as well because of demand for diverse agri produce thus will help in stabilizing skewed cropping pattern already existing because of implementation of MSP.
- Integration will also help in bringing end to black marketeering and hoarding of agri produce which were affecting the income of farmers very badly through lack of demand on seasonal basis examples include onion and tomato prices.

Conclusion:

Food processing has numerous advantages which are specific to Indian context. It has capacity to lift millions out of poverty and malnutrition. Government should develop industry in a way keeping in mind the interests of small scale industry along with attracting big ticket domestic and foreign investments. The entire food value chain in India is controlled by multiple ministries, departments and laws. A comprehensive policy will ensure that various initiatives across the departments are aligned to the overall goal of ensuring availability, awareness, affordability, access, quality and safety of food. The target of ensuring food security for more than a billion people requires a concerted effort by all stakeholders including government and the food processing industry. In addition to private players and government, industry bodies and academia will also have a crucial role in the success of these initiatives.

26. What role does the corporate sector play in the development of the agricultural sector? Is it possible to envisage a prosperous agrarian economy without the participation of the corporate sector? Critically comment.

Approach

The candidate needs to address the question two parts where the first part highlights the role of corporate sector could play in the development of the agricultural sector while in the second part you need to critically comment on the aspect of whether it is possible to envisage a prosperous agrarian economy without the participation of the corporate sector.

Introduction

Agriculture is the primary source of livelihood for about 58% of India's population. Gross Value Added (GVA) by agriculture, forestry and fishing was estimated at Rs. 19.48 lakh crore in FY20. The current private corporate investment in agriculture as a percentage of the total annual investment in agriculture is about 2%, which is very less and thus showing agriculture's high reliance on the Government.

Body

Recently, Prime Minister Narendra Modi called for increased participation of the private sector in agriculture, especially in research and development. In this background, the role of corporate sector in development of the agricultural sector can be seen from the following points –

- The concept of a free market in agriculture will pave the way for corporate sector and make it more efficient. The emergence of private investment is expected to revamp the sector by driving productivity, adopting new technology, and integrating supply chain "from farm to fork".
- There is a need to improve the existing underdeveloped marketing system for better access. The Dalwai committee report (2017) estimates that the country requires 10,130 agriculture markets based on population, production, and geographical area. Currently, there are 6,676 markets in the country and thereby have a space for additional 3,568 markets.
- The recent farm acts create an opportunity for the private sector to intervene and invest in separate modernised trading platforms. Further, electronic trading platforms are also as crucial as physical trading platforms.
- The private sector can also help in developing post-harvest facilities like warehouses and cold storages. Given that production cycle is limited to few months, ensuring round-the-clock supply requires sufficient inventories the whole year in cold storages and warehouses.
- In this regard, earlier, private players were reluctant to invest in post-harvest facilities due to abrupt stock limits imposed through Essential Commodities

Act. The new bill on "Essential Commodities (Amendment)" will now envisage investment in storage and warehouses by the corporate sector.
- A well-developed process of marketing along with informed cropping decisions by farmers can go a long way in reducing the price volatility and will enable transparent price discovery.
- With the entrance of private players, it is plausible that existing mandis will reinvent themselves by reducing the prevalence of licence raj, loosen the entry barriers for the traders, lowering the market fees, and investing in modern facilities.

At the same time, there are many voices for ensuring prosperity in agrarian economy without the participation of corporate sector where –

- Agriculture being the dominant sector, bringing it into the profit oriented world of corporates can prove harmful. For example, many farmers in the USA suffered after unhinged corporatisation of farm sector.
- Corporate sector involvement many a times leads to monopoly, which could be economically disastrous for the farm sector. This monopolistic tendencies are evident from the example of telecom sector.
- Further, India has millions of small farmers, who cannot be left at the mercy of corporates, who are driven by profit. This will aggravate the already grim agrarian crisis in the country.

But the experience of past several decades in the form of socialism has led to the realisation that involvement of corporate sector can have immense significance to make agriculture sustainable and profitable and making it a tool to overcome poverty. Following points can be considered in this regard –

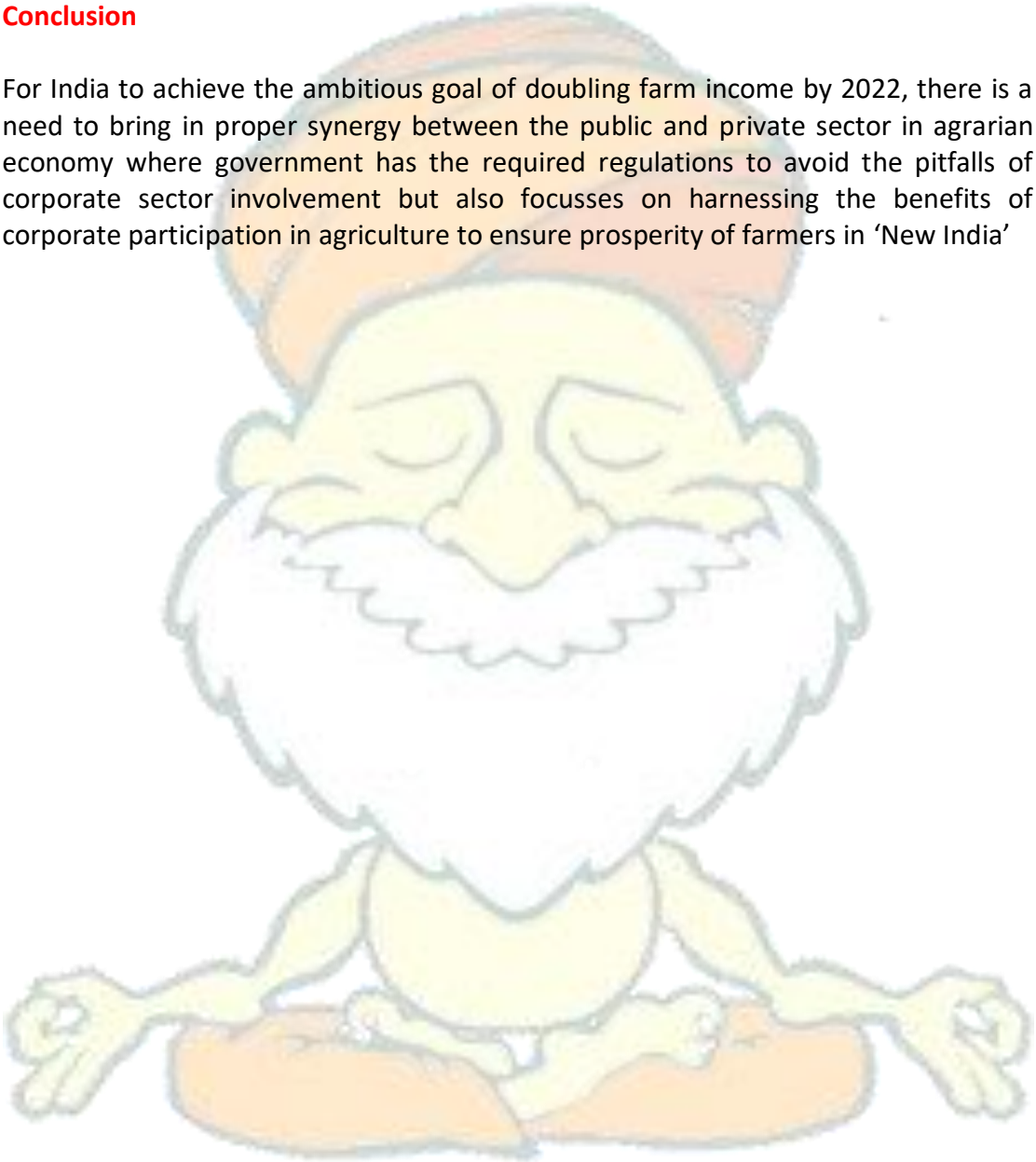
- According to an ADB report, "growth in agriculture supports the subsequent growth of industry", not the other way round that India pursued. This clearly necessitates the need for corporate sector involvement in agrarian economy.
- India invests very little in agriculture research and education (R&E), which Prof. Gulati claimed to have the "highest impact" on agri-GDP growth and poverty alleviation. Further, India's investment in agriculture has seen a fall. Agriculture's share of gross capital formation (GCF) fell from 8.5% of the total GCF of economy in FY12 to 6.5% in FY19, mainly due to a fall in private investment - according to the Agricultural Statistics at a Glance, 2019.
- These statistics point to the limited governmental capacity in ensuring proper development of agrarian economy and need for private sector involvement.
- Also, the example of dairy and milk sector in India is a proof to the benefits of private sector involvement where farmers involved in dairy sector have seen substantial growth in income as well as made India, the largest milk producer in the world.
- The three agriculture laws brought by the government seek to create the architecture for such investment and make agriculture a success story like the

milk sector where government agencies compete with the private sector, farmers get good price and consumer also gains in the process.

- Contract farming under India's new agri laws would lead to the establishment of large farms and the development of state-of-the-art infrastructure by clubbing landholdings of small, marginal and poor farmers, who have less than five acres and constitute 86 per cent of the farmers.

Conclusion

For India to achieve the ambitious goal of doubling farm income by 2022, there is a need to bring in proper synergy between the public and private sector in agrarian economy where government has the required regulations to avoid the pitfalls of corporate sector involvement but also focusses on harnessing the benefits of corporate participation in agriculture to ensure prosperity of farmers in 'New India'



27. What are the key factors that reduce the competitiveness of India's farm produce in the global export market? Discuss. What immediate measures can be taken to address the same? Suggest.

Approach

Candidates are expected first to write about Indian agri exports and factors responsible for reducing India's competitiveness it's farm produce at global platforms. And then in second part suggest the measures that can enhance India's farm produce competitiveness.

Introduction

Agricultural export constitutes 10% of the country's exports and is the fourth-largest exported principal commodity. However in the global trade, the share of India is only close to 2%. To achieve the true potential and export a greater share of what is being produced in India, there is an immediate need to address the export challenges.

Body

Indian agri export:

- During April-August 2017, exports of agricultural and processed food products summed up to US$ 7.26 billion.
- During the period, export of cereals and animal products accounted for 45.62 per cent of the total exports, followed by livestock products (23.78 per cent), other processed foods (17.92 per cent), fresh fruits and vegetables (7.45 per cent), processed fruits and vegetables (6.25 per cent) and floriculture and seeds (1.15 per cent).
- Export surplus from the country's agricultural trade is higher than the corresponding figure achieved by the manufacturing sector.

Factors responsible that reduce India's farm produce competitiveness in global market:

- Sanitary and Phytosanitary Measures: In the year 2016, the India's share in EU's imports of fresh and processed food products was 2.9 per cent, which was lower than that of other developing countries including Brazil (7.8 per cent), China (4.9 per cent), Turkey17 (4.5 per cent) and Vietnam (3.4 per cent). Border rejections as a percentage of total notifications raised are the highest for India, when compared to other developing countries.
- Lack of synergy between the state and central government as agriculture is a state subject, while the state's role for exports is undefined.
- Low Automation and processing of food: only ~ 10% of the food is processed. This leads to lots of wastage and reduces export capacity.
- The long-distance affects the viability of export shipments due to high transport costs and quality losses. Hence, this time efforts were made for reducing the transit time by using refrigerated rail containers (freight

transport that is refrigerated for the transportation of temperature-sensitive cargo).

- High Tariffs and Protectionist Policies: India has the highest average applied tariff of any G20 country and among the highest bound tariff rates in the WTO.
- The problem is that Indian industries do not invest time and money in innovation and research. There is a serious knowledge gap between Indian industries and the international market.
- The government pro-consumer bias in India's farm policy is unfair in putting export restrictions on important food items to prevent inflationary pressures in the domestic economy.
- The policy deprives farmers of higher prices in the international market and also adds an element of income uncertainty. If the government is going to impose export restrictions when international prices peak, farmers would lose part of the incentive to cultivate exportable crops.

Increasing agri – exports will help increase India's export basket and would also expand farmers' incomes and amend farm distress. Measures to make Indian farm produce globally competitive:

- This objective is achievable, provided there is a paradigm shift in policy-making from being obsessively consumer-oriented to according greater priority to farmers' interests.
- Recently, the APEDA along with Government of Andhra Pradesh has dispatched the first shipment of high-quality bananas from Anantpur to JNPT in Mumbai for exports to international markets. India government should take such case studies as reference to formulate policies.
- To boost agriculture exports, the government and business promoting agencies should focus on the use of technology and innovation, he said, adding, the government should support only those who are willing to invest in research.
- If India has to promote agri-exports, the country's policymakers must build global value-chains for some important agri-commodities in which the country has a comparative advantage.
- Stimulating agri – exports would require infrastructure and institutional support — connecting export houses directly to farmer producer organizations (FPOs), sidestepping the APMC-regulated mandis, removing stocking limits and trading restrictions.
- The country has a great potential to export fish and seafood, bovine meat, and fruits, nuts and vegetables. These are the commodities to focus on in order to stimulate agri-exports.
- On lines of the 'Make In India' campaign, the report urged the government to launch 'Grow In India' campaign aiming for substantial gains in agri-exports with a single authority to monitor India's international agricultural trade-both exports and imports.

Conclusion

A “farm-to-foreign” strategy, improving agri-trade surpluses by promoting agri-exports, and most importantly create more jobs and bring prosperity to rural areas can sure be a go ahead.

28. What are the factors responsible for food inflation in India? How does food inflation impact the farmers? Examine.

Approach- Question is straight forward. Candidate can define inflation and reasons of food inflation in first part and then discuss impact of food inflation on farmers with the way ahead.

Introduction

Food inflation is volatile. Agricultural prices tend to fluctuate because demand and supply are both inelastic and supply can vary due to the weather. However, despite the usual volatility, food prices seem to be showing a strong upward movement, reaching record highs in recent years.

Body

In India, a booming economy has GDP expanding at 9% a year. Official inflation is around 7%, but, headline food inflation is more than double at 17.8%.

Some key reasons for Inflation:

- High demand and low production or supply of multiple commodities create a demand-supply gap, which leads to a hike in prices.
- Excess circulation of money leads to inflation as money loses its purchasing power.
- With people having more money, they also tend to spend more, which causes increased demand.
- Spurt in production prices of certain commodities also causes inflation as the price of the final product increases. This is called cost-push inflation.
- Increase in the prices of goods and services is also a factor to consider as the involved labour also expects and demands more costs/wages to maintain their cost of living. This spirals to further increase in the prices of goods.

Food Inflation is a major cause of inflation in India today, reasons for inflation

- Untimely rains, drought in some regions and crop losses due to local factors did contribute to supply shocks.
- Transmission of global food prices, which have shown a rising trend in the last half-year, also is the reason for food inflation.
- The government policy of untimely imports in pulses flooded the markets and contributed to lower price realization last year. This led to lower production of pulses this year.
- The government had procured 34 million tonnes of wheat in 2019, on top of the 36 million tonnes procured in 2018. These are the highest procurement levels since 2012-13. However, it failed to distribute the wheat through the public distribution system. This has created an artificial scarcity that has led to Inflation.

How does food inflation impact farmers?

- Increasing food demand and price could be the best opportunity to lure farmers back to farms. But today there is a pressing concern, particularly for a country like India, which has the world's largest number of poor.
- Going by recent studies and anecdotal field reports, food inflation has impacted the health of the poor the most. It is an irony that while globally the fight against malnutrition is intensifying, food inflation may be impeding it within the country.
- Given that an average household in India spends nearly 50 per cent of its earning on food—the poor spend more than 60 per cent—price rise will precipitate a crisis. Going by the survey findings, the impacts will be severe in India.
- As inflation increases, prices paid by farmers for various inputs increase faster than the prices they receive for their products, thereby the terms of trade for farmers deteriorate as the rate of inflation rises.
- Farmers have flexible money incomes. Therefore, theoretically at least, they should benefit from an unanticipated increase in the rate of inflation. Empirical studies however, have not found this connection.
- On the other hand, higher marketing margins due to imperfections in the agricultural markets, stirred up by higher wages and various other marketing costs, reduce the demand for farm output at the farm level.
- Also the inflation targeting in India has adverse effect on food prices. Since food items have a large weight in the consumer price index, any effective strategy of inflation containment seeks to keep food prices low. This is sought to be achieved through measures that keep farm-gate prices low.
- These penalize the agricultural sector by leading to a reduction in subsidies and a decline in investment, both of which contribute to raising input costs. The real cost of inflation-targeting is therefore borne by farmers, who are deprived of remunerative prices.
- Though the inflation takes more out of the pocket from the common man, it does not benefit farmers much. The middlemen are the real beneficiaries.

Conclusion

With food accounting for two-thirds of household budgets, higher prices will worsen demand for non-food goods. At a time when consumption expenditure data shows rising poverty along with declining wages, climbing inflation will only lead to increased vulnerability, while making an economic recovery harder and the situation worsening for farmers.

29. What do you understand by the terms 'forward' and 'backward' integration in food processing industries? Illustrate with the help of suitable examples.

Approach:

Question is asking you to illustrate such an answer will generally involve the use of many examples, such as tables, figures, graphs, or concrete research statistics and evidence.

Introduction:

Food processing is the transformation of raw ingredients into food, or of food into other forms (i.e. food processing may denote direct manufacturing of food or value addition on existing food). Food processing typically takes harvested crops or butchered animal products and uses these to produce long shelf-life food products. It also includes the process of value addition to produce products through methods such as preservation, addition of food additives, drying etc. with a view to preserve food substances in an effective manner, enhance their shelf life and quality.

Body:

Forward Linkage: Forward linkage integration refers to consolidating the chain from processing industries to market. It is when, the establishment of a processing industry can lead to the development and establishment of the number of advanced stage industries.

There are many examples such as:

- In context with Food Processing Industry, a Food Processing Unit needs to have strong backward linkages with the farmers, farmer producer organizations, self-help groups, farmer's groups etc.
- Further, to be able to sell its processed food, it needs to develop strong forward linkages with wholesalers, retailers, exporters etc.
- Forward Integration refers to that integration where Company expands its activities to downstream areas. Company aims to get more control over sales, consumer-contact and eliminate any middlemen, wholesaler, retailer. e.g. Amul has its own pizza outlets and ice cream parlours.
- products such as vegetable oils and rubber are used in a wide variety of manufacturing industries; based on the preparation of hides and skins, tanning operations can be started, as can the manufacture of footwear and other leather goods.

Backward Linkage: backward market integration refers to consolidating chains from farm to processing centres and to integration with ancillary industries. The feedback effects generated by a base industry on the development of the base sector is called backward linkage. The development of the food processing industry has many feedback effects on the agriculture sector itself.

There are many examples such as:

- Once a food processing industry is established, it results in increasing the demand of raw materials provided by the agriculture sector.
- The establishment of processing facilities is itself an essential first step towards stimulating both consumer demand for the processed product and an adequate supply of the raw material.
- Backward integration refers to that integration where company expands its activities to upstream areas. Company aims to get raw material at cheap rates, uniform quality, steady supply and eliminate any middlemen. E.g., Starbucks (chain of coffee bars) buys coffee plantations in central America.
- The provision of transport, power and other infra-structural facilities required for agro-industries also benefits agricultural production.
- The development of these and other industries provides a more favourable atmosphere for technical progress and the acceptance of new ideas in farming itself.

Conclusion:

For an industry, backward linkages are directed towards suppliers; while the forward linkages are directed towards consumers. Rising per-capita income, changing life style and food habits provide significant opportunities for the growth of Food processing industry. ordinances and the schemes like SAMPADA, etc. are likely to strengthen backward and forward linkages in turn help the Food processing industries to grow from present 2% of GDP to optimise high output of farming sector.

30. Do an evaluation of the potential of food processing industries in the economically underdeveloped regions of the country.

Approach:

Question is straight forward in its approach, students need to evaluate the potential of food processing industries in the economically underdeveloped regions of the country, also they are expected to mention the issues the industry is facing in such areas of the country and how those issues can be addressed.

Introduction:

India Food Processing Industry is estimated at $135 billion industry which is growing at about 8% annually. This growth rate is significantly more than agricultural growth rate which remains around 4%. These signals indicate toward phenomenal shift toward food processing from traditional ways. GDP by processing constitute about 10% that of agriculture. But given potential of India, this is an underachievement. With India moving from a position of scarcity to surplus in terms of food production, the opportunities for increasing food processing levels are innumerable. India's food processing sector, in recent years, has been known for its high-growth and high-profits, thus, increasing its contribution to the world food trade every year.

Body:

Currently, Indias food processing industries are localized mostly in urban areas most of the processing takes place in limited crops only, the reasons for the same are as follows-

- Lack of efficient supply chain infrastructure and inadequate expansion of processing and storage capacity commensurate with agriculture production have been identified as the main reasons for higher wastages, higher cost of production, lower value addition in food processing sector.
- Processors face difficulty in availing benefits under schemes being implemented by different agencies of central and state governments in the absence of exclusive supportive forum at the state level. Lack of awareness and absence of appropriate knowledge sharing & guidance forum adds to their problem.
- Multiple clearances are required for setting up of food processing units. The small processors are also required to go through the same processes as is applicable to larger units. Availing permission for Change in Land Use (CLU), environmental clearance, water and power connections are not only time consuming but also costly.
- Food processing units are required to comply with labour laws in relation to lay-off, retrenchment and closure even though these units run seasonally. Further, payment of minimum charges for electricity even though units run for few months in a year, adversely affects the commercial viability of the processing units.

- India is processing less than 10% of its agricultural output, thus, presenting immense opportunities for increasing these processing levels and leading to investments in this sector. With agriculture and its allied sectors being the largest source of livelihoods in India, 70% of its rural households still depend primarily on agriculture for their livelihood. Thus, this sector provides a huge employment generation potential as well. The food processing sector has been acknowledged as a high priority industry by the government of India and is currently being promoted with various fiscal reliefs and incentives.

Potential of food processing in economically underdeveloped regions of the country-

- Agriculture and allied sectors and rural India have enormous employment opportunities and affect the country most, so the government reinforced stress on the supply chain and agriculture and rural sectors and related industry, including domestic trade and export, food processing, fisheries, animal husbandry, cold storage, etc.
- With an increase in urban working culture and fast-paced lifestyles, there is limited time available for cooking and meal preparation. Thus, processed foods such as ready-to-eat products and snacks have become quite popular, particularly in urban areas. By 2030, Indian annual household consumption is set to treble, making India an opportune market for consumption of processed foods.
- India boasts of the world's largest population of livestock and is currently the third largest egg producer in the world, as per FAO (Food and Agriculture Organisation) in 2016. Additionally, India is also the fifth largest producer in broiler production. However, India currently processes only 6 % of poultry and 21 % of meat.
- India has a rich and diverse fisheries resources such as deep seas, lakes, ponds and rivers. They account for more than 10 % of the global biodiversity in terms of fish and shellfish species. India's vast potential in the sector can be seen in its long coastline spanning 8,118 kilometers apart from the inland waterways.
- Within India, Uttar Pradesh is the largest dairy and milk-producing state because it is home to the highest buffalo population and the second-highest cattle population in the country. Most of the rural population in this state is engaged in livestock rearing and dairying. Gujarat has numerous cooperative dairy milk unions, private dairy plants, and primary milk cooperative societies, which play crucial roles in the production of milk in the state. Being one of the primary dairy consumables, the increase in demand for milk in the country can be linked to an increasing population. Investment in the infrastructure required to change this ecosystem to an organized and hygienic one would be tapping into unrealised potential for supply and distribution logistics as well as a huge customer base.
- Malnutrition and dietary risks associated with diseases remain prevalent globally, including in India. In addition to this, rapid urbanization, changing lifestyles and lack of awareness with respect to the required nutrition intake have led to a greater need for health supplements and nutraceuticals in the

Indian market. Ensuring safe and nutritious food for over 1.3 Bn Indian citizens on pan-India basis calls for massive outreach efforts. India represents a vast market for nutraceuticals as almost every segment has a need for some form of nutraceuticals.

Government initiatives in this direction-

- PRADHAN MANTRI KISAN SAMPADA YOJNA (PMKSY)- Mega Food Parks are based on 'cluster' approach and focus on creation of state-of-the-art support infrastructure in a well-defined agri/horticultural zone for setting up of modern food processing units in the industrial plots provided in the park with well-established supply chain.
- Scheme for Cold Chain and Value Addition Infrastructure-It covers creation of infrastructure facilities along the entire supply chain viz. pre-cooling, weighing, sorting, grading, waxing facilities at farm level, multi product/ multi temperature cold storage, CA storage, packing facility, IQF, blast freezing in the distribution hub and reefer vans, mobile cooling units for facilitating distribution of horticulture, organic produce, marine, dairy, meat and poultry.
- Scheme for creation of backward and forward linkages-Provide effective and seamless backward and forward integration for processed food industry by plugging the gaps in supply chain in terms of availability of raw material and linkages with the market, financial assistance provided for setting up of primary processing centers/ collection centers at farm gate and modern retail outlets at the front end along with connectivity through insulated/ refrigerated transport.
- PM Formalisation of Micro Food Processing Enterprises' (PM FME)- The Scheme adopts One District One Product (ODOP) approach to reap benefit of scale in terms of procurement of inputs, availing common services and marketing of products. The states would identify food product for a district keeping in view the existing clusters and availability of raw material. The ODOP product could be a perishable produce based product or cereal based products or a food product widely produced in a district and their allied sectors.

Conclusion:

Food processing seems to have promising future, provided adequate government support is there. Food is the biggest expense for an urban Indian household. About 38 % of the total consumption expenditure of households is generally spent on food. This share is declining consistently. As mentioned, food processing has numerous advantages which are specific to Indian context. It has capacity to lift millions out of undernutrition. Government has challenge to develop industry in a way which takes care of small scale industry along with attracting big ticket domestic and foreign investments.

31. What are the main constraints in the management of supply chain of food and agri products in India? What reforms would you suggest to address these challenges?

Approach

A straightforward question where in the candidate needs to address the question in two parts, with the first part addressing the main constraints in the management of supply chain of food and agri products in India while in the second part, the candidate needs to suggest some reforms that would address the challenges mentioned above.

Introduction

Food supply chain management refers to the process whereby the movement of agro based product(s) from the initial supplier to the ultimate user occurs with all non-value adding expenses. In this regard, the Indian agriculture supply chain is far more complex and difficult to manage, as compared to developed countries because of its unorganized nature and a large number of intermediaries.

Body

Agriculture is inherently a fragmented and unorganized sector involving a diverse range of distinct stakeholders such as inputs supplier, farmers, traders, commission agents, processors and distributors. Here, the main constraints in the management of supply chain of food and agri products in India include –

1. **Fragmented supply chain**: The long and fragmented supply chain results in the wastages and price escalations due to the large share of unorganised players in the supply chain and operating commercial viability challenges.
2. **Inadequate cold storage and warehousing facilities**: Warehousing is a key requirement in the overall supply chain it is mostly dominated by unorganized players. 20% of warehousing is organized currently with 70% of the organized market controlled by the Government.
3. **Logistical challenges related to quality and connectivity**: Indian national highways account for only 2% of the total road network but carry 40% of all cargo. Port capacity may be increasing but lack of connectivity to these ports leads to cost escalations and delays in the goods transferred.
4. **Lack of demand estimation**: Demand forecasting is totally absent and the farmers try to push whatever they produce into the market.
5. **Lack of system integration**: The supply chain needs to be designed and built as a whole in an integrated manner. The process of new product development, procurement and order to delivery processes should be well designed and well supported with the help of IT tools and software.
6. **Lack of technology applications**: Cold chain logistic supply chains should take advantage of technology improvements in data capture and processing,

product tracking and tracing, synchronized freight transport transmit times for time compression along the supply chain and supply-demand matching.

7. **Presence of large number of unorganized retailers**: At present the unorganized retailers are linked with farmers through wholesalers or commission agents. The commission agent's and wholesaler's redundant supply chain practices make unorganized further inefficient.
8. **Lack of proper Sorting and grading technology**: Farmers lack the knowledge about the process as the entire ecosystem with regards to quality control is missing on a wider scale in India.

In order to shore up the emergence of professionally managed agri-supply management of different agricultural produce, the Government should play its facilitating role to its hilt while also considering the following reforms to address multiple challenges involved –

- Focus should be laid on free play of demand and supply forces in the market. This has to be enabled by removing different entry barriers, having a proper market information system, promoting grading and standardization, taking care of quality and safety issues, etc.
- Vertical coordination of farmers through cooperatives, contract farming and retail chains would facilitate better delivery of output, reduce market risks, provide better infrastructure and create awareness regarding the prevailing and new technologies.
- More focus on Mega food parks – where Mega Food Park consists of supply chain infrastructure including collection centres, primary processing centres, central processing centres, and food processing units.
- Customized logistics is another important immediate requirement to make logistic effective. This reduces the cost, facilitates the maintenance of quality of the produce and fulfils the requirements of targeted customers.
- Public private partnership is another strategic solution. Supply chain like washing, waxing, grading, sorting, packing, pre-cooling, handling facilities, insurance, finance, transport and processing facilities would add value to supply chain functioning.
- It is time a proper marketing system is in place for disseminating information on what to produce, when to sale and where to sell etc. and on packaging, transportation, grading, and standardization.
- Different legal restrictions inhibiting growth of competitive environment should be dismantled and replaced by a facilitating legal environment.

Conclusion

The supply chain management has to be improved in all the stages of the supply by adopting global best practices in storage, packaging, handling, transportation, value added service etc. And also by disintermediation and participation of organized players i.e., modern supply chain with a view to benefit both farmers as well as ultimate consumers.

32. How can digital technology help in undertaking second-generation land reforms? Discuss.

Approach

Candidates are expected first to write about second generation land reform and then address the main demand of question how use of digital technology will help in undertaking second generation land reforms.

Introduction

Second generation land reforms are aimed at reorganising state and collective farms into family-size units and introducing market-oriented land systems. It is broadly about leaving resource allocation and production decisions to market forces rather than to the government institutions.

Body

Issues in undertaking land reforms for economic development:

- Benami Transfers: Excess lands were transferred to ghost beneficiaries.
- Unproductive lands: The excess lands transferred were fallow or infertile lands which was of less use for cultivators.
- Fragmentation: It led to fragmentation of land holdings, there by increasing small and marginal farmers.
- Mechanization: With small and marginal land holdings, investment on machine and return on their investment was poor.

Digital technology a useful tool in undertaking second generation land reforms:

- For a majority of Indian households' wealth invested in real estate, accessing land records and other details of encumbrances including mortgage, liability or claim against a property, is often difficult. Investors too face the drudgery of visiting public land record departments and Registrar's office to verify land records and register land agreements.
- A centralized land records system and reforms in land laws are thus the need of the hour to ward off internal constraints, local agitations, and speculative increase in land prices. The GIS land bank system launched by the government recently is a potent step towards actualizing this clamour for change by addressing issues like transparency and credibility directly.
- The GIS land bank system will serve as an information window for investors providing access to an array of details on various industrial belts, eliminating the need to visit various offices and platforms for land information and obtain clearances.
- The land bank system will also push the approach of "One District One Product", in line with the AtmaNirbhar Bharat vision, boost employment opportunities and attract investments from abroad by showcasing the improving ease-of-doing-business.

- With the arrival of GIS-enabled one-stop digital land bank platform, land records would be just a click away and can be accessed from anywhere around the world, enabling seamless and credible property registrations online, doing away with the need of any authorised intermediary.
- The Blockchain in the land registry is used for secure transfer of land property. The transparent nature of Blockchain enables to track the changes made in land documents. Advent of Blockchain technology in the land registry is playing a very beneficial role in this developing era. It is helping in uplifting the poor, and marginalized section of the society in fighting illegal authorization of land.
- The digitization of land records will mark an epoch in the history of real estate and amplify the potential of the country's real estate. The property sector which had for long been plagued by land issues that snowballed into complex litigations and disputes, will breathe a sigh of relief at this renaissance.
- With 24/7 availability of data online, it will become easily for buyers and sellers to scrutinize property data online and check the authenticity of a land or property.
- Digital enabled land records system, a full spectrum rollout in the near future will help organizations and decision makers to gain a deeper understanding of property economics, make faster decisions and take advantages of property developments in future essentially, what we often call a 'game changer'.

Conclusion

With the digitization of land records, a clear picture of land data, starting from the first owner of the land to its present status, including image of property and landowner will be available. This will eradicate confusion between government land and private land, usher transparency, and speed up land acquisition; the use of reliable digital land records will add considerable impetus for India's rapid economic growth through better functioning of land markets and boost investment too.

33. How do fragmented and small land holdings affect agricultural productivity? How severe is this problem in India. Discuss.

Approach- Candidate can outline the problems faced by agriculture sector because of the small land holdings. With the help of some data and facts, can suggest a way forward in the conclusion.

Introduction

From farm subsidies to farm loan waivers, the Indian government spends crores on farmer welfare, but these efforts will be inadequate unless they can tackle an increasingly daunting barrier: lack of land. The provisional figures from the latest agriculture census reveals how land—the most critical input for agriculture is getting more fragmented.

Body

How serious is the problem?

- Since the first agriculture census over 45 years ago, the number of farms in India has more than doubled from 71 million in 1970-71 to 145 million in 2015-16, while the average farm size more than halved from 2.28 hectares (ha) to 1.08ha
- The more numerous farms have been driven by rural population growth. Between 1970-71 and 2010-11, the number of farms increased by 194%, almost exactly in line with rural population, which increased by 189%. As Ramesh Chand and others pointed out in a 2011 Economic and Political Weekly research paper, this relationship is a reflection of India's inheritance pattern, which leads to farms divided between multiple heirs.
- The majority of India's farms (86%) are less than 2ha. The bulk of which are located in the poorer states such as Uttar Pradesh and Bihar.

- The Indian experience shows that small farmers are more productive than large farmers. Ramesh Chand and others show that small farmers use more inputs (such as fertilizers), use their land more intensely (planting more crops) and adopt more technology. Yet, despite this efficiency, farm incomes remain poor. It is the poor returns to farming—despite intensive efforts put in by farmers—that lie at the root of India's farm crisis, and the recent farm angst.
- Given household sizes in rural India, small farms struggle to generate enough income for everyone in a household and often lack alternative sources of income.
- National Sample Survey Office's (NSSO) 2003 and 2013 surveys of farmers to show how farm size is an important determinant of income and, consequently, income inequality. They find that in 2013, for marginal farmers(less than a hectare of land), household consumption exceeded net monthly income of less than ₹ 5,500 from both farming and non-farming activities.

Way ahead

- One obvious solution to small farm sizes will be consolidating land into larger farms by enabling land leasing. However, this can be a complex and costly process, made more difficult by the lack of accurate land records.
- PRS survey pointed out that, despite most states computerizing and digitizing land records, as of 2017, spatial data had only been verified in 39% of villages. This is particularly problematic for small farmers who, without accurate land records, cannot access credit or secure insurance.
- India's farmers are not alone in these struggles. A 2016 study estimated that around 84% of the world's farms are less than 2ha. While many of these small farms face the same challenges, some small farmers, such as those in China, have been more successful in securing sustainable livelihoods.
- Economists agree that improving land records, investing in research and development, providing local rural non-farm employment opportunities and building better rural infrastructure are policies that can help small farmers.

Conclusion

More resources should be allocated to agriculture to increase irrigated area, improve soil health, promote agri -processing, and cover production risk, among many others. Despite various schemes already existing in the agriculture sector, it continues to remain a laggard, in order to ensure flourishing and vibrant agriculture improvement of land record and experiment of land consolidation on the basis of China's experience can be become effective alternative.

34. What are rare earth metals? What are their applications? What are the issues with its extractions? Discuss

Approach

A simple and straightforward question where in the candidate needs to explain what are rare earth metals along with their applications in the first part of the answer while discussing the issues with the extractions of these metals in the second part of the answer.

Introduction

Rare earth metals are metals obtained from a group of 15 elements referred to as the lanthanide series in the periodic table of elements. Scandium and yttrium, while not true rare earth elements, are also included. REEs are key components in many electronic devices that we use in our daily lives, as well as in a variety of industrial application.

Body

Rare earth metals comprise seventeen chemical elements — anthanum, cerium, praseodymium, neodymium, promethium, etc. Despite their classification, most of these elements are not really “rare”. One of the Rare Earths, promethium, is radioactive. As essential and functional materials, rare earth elements have been named "**The Vitamins of Modern Industry**". In this regard, their applications can be seen from the following points –

1. The manufacturing of permanent magnets represents the single largest and most important end use for REMs, accounting for 38% of total forecasted demand.
2. Permanent magnets are an essential component of modern electronics used in cell phones, televisions, computers, automobiles, wind turbines, jet aircraft and many other products.
3. They are used as phosphors in many consumer displays and lighting systems, and are also used in fluid cracking catalysts and catalytic converters in the oil and automotive industries and medical industry.
4. Rare Earth metals are used in space shuttle components, jet engine turbines, and drones. Cerium, the most abundant Rare Earth element, is essential to NASA’s Space Shuttle Programme.
5. REE are also vital for many defence technologies, including precision guided munitions, targeting lasers, communications systems, airframes and aerospace engines, radar systems, optical equipment, sonar, and electronic counter measures.
6. Scandium is used in televisions and fluorescent lamps, and yttrium is used in drugs to treat rheumatoid arthritis and cancer.

According to the Rare Earth Technology Alliance (RETA), the estimated size of the Rare Earth sector is between $10 billion and $15 billion. In this regard, some issues with regards to its extraction can be seen from the following points –

- **Low Concentration:** Global rare-earth reserves are at more than 130 million metric tons. However, most of those reserves either are too low in concentration to be extracted economically, or they are not readily accessible, such as metals locked away in deep-sea manganese-based nodules or hydrothermal deposits.
- **Extraction Costs:** REMs are found in a variety of minerals, but not all are equally suitable for economic development. REMs are generally found in concentrations below what is economically viable for extraction at current prices using available technology.
- **Environmental factors:** Extraction and mining of rare earth metals involves similar land-use exploitation, environmental damage and ecological burden as any other mining operation. They are mined using extremely energy-intensive processes, spewing carbon emissions into the atmosphere and toxins into the ground.
- **Geopolitical Issues:** China is the world's largest producer of REEs, accounting for over 60% of global annual production, estimated at 132,000 tonnes for 2019. It withheld the supply of Rare Earths to Japan after their dispute over Senakaku Islands, which alerted the world to use of rare earths for geopolitical purposes.
- **Supply Monopoly:** China remains virtually the only producer of the valued heavy REMs. China imposed export restrictions on REE between 2010 and 2014, resulting in dramatic increases in REE prices during those years. This leads to uneconomical trends in other countries for rare earth extraction.
- China's intents of hegemony, non-solidarity with other nations does not augur well for the environment in general, as well as for geo-politics and global renewable energy usage and scenarios. Its intents on doing the same with its vast rare earth reserves will be detrimental.

Way Forward –

- Recycling of these rare earth metals for continuous usage for various technologies is a good option that can be considered.
- Diversifying the supply chain of Rare Earth Metals around the world, especially focusing on the same in India.

Conclusion

Rare earths have become indispensable and, in many cases, irreplaceable components of materials that are essential in modern life. Thus the usage of these metals, which form a critical part of the renewable energy revolution should be handled with careful, sincere and cleaner measures if the way forward has to be greener and environment-friendly.

35. With the help of suitable examples, discuss the applications of robotics in agriculture.

Approach

Candidates are expected to write about use of robotics in agriculture and then with the suitable examples discuss the application of robotics in agriculture.

Introduction

Agriculture is quickly becoming an exciting high-tech industry technology it is developing rapidly, not only advancing the production capabilities of farmers but also advancing robotics and automation technology as we know it.

Body

Robotics in agriculture:

- An agricultural robot is a robot deployed for agricultural purposes. Agricultural robots automate slow, repetitive and dull tasks for farmers, allowing them to focus more on improving overall production yields.
- Harvesting and picking is one of the most popular robotic applications in agriculture due to the accuracy and speed that robots can achieve to improve the size of yields and reduce waste from crops being left in the field.
- Many agricultural robotic advancements use machine vision technology to avoid hazards, identify crops, and even determine if they are ready to be harvested.

Applications of the robotics in the agriculture:

- Weeding: Combatting weeds and making sure crops have room to grow is a constant struggle for farmers. For example Using computer vision and a variety of mechanical tools, the robot plucks out individual weeds instead of using chemicals.
- Spraying: Similar to manual weeding robots, smart sprayers are typically paired with computer vision cameras to identify weeds for targeted herbicide applications. For example Sophisticated systems can even identify specific plants and activate only the relevant application nozzles. This means less waste, reduced herbicide resistance, and more efficient application across fields.
- Picking: Strawberries, like many berries and tender fruits/veggies, demand a very intensive harvesting program. Harvesting these crops require a lot of labour and time, both of which are often in short supply. The harvest process is quite intense, and farmers often run short of workers due to the backbreaking nature of the harvest.
- Seeding: Automated drone seeders are mostly used in forestry industries right now, but the potential for more widespread use is on the horizon. They are also able to plant much more efficiently with a team of two operators and ten drones capable of planting 400,000 trees a day.

- Robotic Harvesting: The robotic system utilizes soft-touch robotics and a lidar sensing system to detect ripe apples, leaving out unripe fruits during the picking process. For example AI-enabled robots are being widely deployed on tomato farms in Japan, and have reduced the on-field labour time by 20%.
- Other applications: Nursery planting, crop analysis, animal husbandry, dairy farming, drone service, harsh terrain resilient farming etc.
- PAAMA Agrico under Made-in-India Agri-Equipments has designed the world-class soil titling blades used in rotovators and cultivators. It enables a Robot to weld blades enabling the precision function ensuring uniformity in production while facilitating repeatability function each time.
- GRoboMac indigenously developed Robot has been designed in such a way that the computerised vision detects and locates the precise 3D coordinates of the bloomed cotton from the images of the cotton plant. A robotic arm uses these coordinates to pick the cotton and the arm, then uses a vacuum for precision picking of cotton and avoids picking any other contaminant.

Shortcomings of such applications in India:

- It will also reshape the definition of farmworkers Substitution of technology may put farmers out of their jobs and render difficulties to the already suffering state of unemployment.
- The capital-intensive nature of Robotics. And high cost of procuring imported hardware components as well as training personnel.
- It runs on increasing further Inequality among small and large landowners.
- Loss of various traditional, yet effectively resilient methods suitable for Indian agriculture.

Conclusion

Embracing new technologies like robotic will be a key factor in the changing face of Indian agriculture. Therefore, any policy measure on this front needs to be carefully designed and implemented. It is important to consider all stakeholders and have collaborated measures in making robotics and other technologies in agriculture affordable sustainable and properly understood by the end users and the farmer.

36. What are the potential applications of artificial intelligence in the field of medicine? Discuss.

Approach- Question is straight forward. Candidate is required to give application of AI in medicine with the help of suitable examples and answer can be concluded with predicting use of AI in various fields.

Introduction

A broad spectrum of intelligent technologies like Artificial Intelligence has managed to penetrate into different industries in this information and technology-oriented era. Healthcare is no exception. It is witnessing the rapid integration of AI over a couple of years. According to a CB Insights Report, 86% of the life science companies, healthcare providers, and technology vendors are relying on Artificial Intelligence technologies. The healthcare systems will be spending $54 million on an average, on different AI projects.

Body

Potential applications of AI in medicine

1. Diagnose diseases
    - Machine Learning particularly Deep Learning algorithms– have recently made huge advances in automatically diagnosing diseases, making diagnostics cheaper and more accessible.
    - Machine Learning algorithms can learn to see patterns similarly to the way doctors see them. A key difference is that algorithms need a lot of concrete examples – many thousands – in order to learn.
    - So Machine Learning is particularly helpful in areas where the diagnostic information a doctor examines is already digitized. Detecting lung cancer or strokes based on CT scans.
    - Assessing the risk of sudden cardiac death or other heart diseases based on electrocardiograms and cardiac MRI images. Classifying skin lesions in skin images, Finding indicators of diabetic retinopathy in eye images.

2. Develop drugs faster
    - Developing drugs is a notoriously expensive process. Many of the analytical processes involved in drug development can be made more efficient with Machine Learning. This has the potential to shave off years of work and hundreds of millions in investments.
    - AI has already been used successfully in all of the 4 main stages in drug development-Identifying targets for intervention, Discovering drug candidates, Speeding up clinical trials, Finding Biomarkers for diagnosing the disease.
    - Machine Learning can speed up the design of clinical trials by automatically identifying suitable candidates as well as ensuring the

correct distribution for groups of trial participants. Algorithms can help identify patterns that separate good candidates from bad.

3. Personalize treatment
    - Different patients respond to drugs and treatment schedules differently. So personalized treatment has enormous potential to increase patients' lifespans. But it's very hard to identify which factors should affect the choice of treatment.
    - Machine Learning can automate this complicated statistical work – and help discover which characteristics indicate that a patient will have a particular response to a particular treatment. So the algorithm can predict a patient's probable response to a particular treatment.
    - The system learns this by cross-referencing similar patients and comparing their treatments and outcomes. The resulting outcome predictions make it much easier for doctors to design the right treatment plan.

4. Improve gene editing
    - Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR), specifically the CRISPR-Cas9 system for gene editing, is a big leap forward in our ability to edit DNA cost effectively – and precisely, like a surgeon.
    - Machine Learning models have been proven to produce the best results when it comes to predicting the degree of both guide-target interactions and off-target effects for a given sgRNA. This can significantly speed up the development of guide RNA for every region of human DNA.

Conclusion

AI is already helping us more efficiently diagnose diseases, develop drugs, personalize treatments, and even edit genes. But this is just the beginning. The more we digitize and unify our medical data, the more we can use AI to help us find valuable patterns – patterns we can use to make accurate, cost-effective decisions in complex analytical processes.

37. How do cryptocurrencies work? What are the issues with their regulation? Comment.

Approach

Explain the working of cryptocurrencies. Also mention issues with their regulations. Comment means you have to give your views and support them with evidence.

Introduction:

Cryptocurrency is a kind of digital money that is designed to be secure and, in many cases, anonymous. It is a currency associated with the internet that uses cryptography, the process of converting legible information into an almost uncrackable code, to track purchases and transfers.

Body:

How do cryptocurrencies work?

- Cryptocurrencies use decentralized technology to let users make secure payments and store money without the need to use their name or go through a bank.
- They run on a distributed public ledger called block chain, which is a record of all transactions updated and held by currency holders.
- Units of cryptocurrency are created through a process called mining, which involves using computer power to solve complicated math's problems that generate coins.
- Users can also buy the currencies from brokers, then store and spend them using cryptographic wallets.

Issues with their regulations:

- There are big concerns about digital coins as a source of fraud. They are also entirely unregulated and some are open to market manipulation.
- Speculators who buy digital coins should be aware they could lose all their money.
- While Bitcoin is decentralized, it is highly volatile at the same time.
- One of the most common practical uses of cryptocurrency is to finance illegal activities, such as buying illegal goods on the dark web.
- Many black market internet stores accept payments in cryptocurrency because they can be highly anonymous and do not require cash to change hands.
- Hackers have taken advantage of digital coins and can target exchanges and accounts, in one case crashing one of the world's largest cryptocurrency exchanges.

Conclusion:

Cryptocurrencies are known for being secure and providing a level of anonymity. Transactions in them cannot be faked or reversed and there tend to be low fees. Their decentralized nature means they are available to everyone, although they can be complicated to set up and few stores accept them for spending.

38. What are sounding rockets? How do they function? Discuss their applications.

Approach:

Question is very simple and straight forward in its approach students are expected to write about sounding rockets their functioning and applications with proper explanation.

Introduction:

Sounding rockets take their name from the nautical term "to sound," which means to take measurements. Since 1959, NASA-sponsored space and earth science research has used sounding rockets to test instruments used on satellites and spacecraft and to provide information about the Sun, stars, galaxies and Earth's atmosphere and radiation.

Body:

These rockets are basically divided into two parts: a solid-fuel rocket motor and a payload. Many of the motors used in sounding-rocket programs are surplus military motors, which keep down the cost of the rocket. The payload is the section that carries the instruments to conduct the experiment and sends the data back to Earth. These rockets produce higher-quality microgravity conditions for longer periods than airplanes, or drop towers, and tubes. An experiment is placed on the rocket, which is launched and then allowed to free-fall back to Earth.

Functioning and applications-

- A sounding rocket follows a parabolic arc, like the aircraft, but goes above the Earth's atmosphere, where air drag does not disturb microgravity conditions. The typical flight profile of a sounding rocket is the following: subsequent to a launch and as the rocket motor uses up its propellants it separates from the vehicle; the payload continues into space after separation from the motor and begins conducting the experiments; when the experiments are completed, the payload re-enters the atmosphere and a parachute is deployed, bringing the payload gently back to Earth; the payload is then retrieved (by retrieving the payload a considerable saving can be achieved because the payload or parts of the payload and experiments can be refurbished and flown again).
- The main difference between a sounding rocket and an orbital launch vehicle is the velocity reached. In fact, a sounding rocket does not reach the velocity (in terms of (km/s)) needed to go into orbit, and after achieving the maximum altitude comes back to Earth.
- The experiments experience several minutes of microgravity before the rocket re-enters the atmosphere. Acceleration levels are usually around 10−5 g.
- Therefore, sounding rockets provide a reasonably economical means of conducting engineering tests for instruments and devices used on satellites

and other spacecraft, prior to their use in more expensive activities. Also, because of their low cost and short mission lead time, they are valuable tools for undergraduate and graduate students conducting research in the microgravity environment.

- They also serve as easily affordable platforms to test or prove prototypes of new components or subsystems intended for use in launch vehicles and satellites. With the establishment of the Thumba Equatorial Rocket Launching Station (TERLS) in 1963 at Thumba, a location close to the magnetic equator, there was a quantum jump in the scope for aeronomy and atmospheric sciences in India.
- ISRO started launching indigenously made sounding rockets from 1965 and experience gained was of immense value in the mastering of solid propellant technology. In 1975, all sounding rocket activities were consolidated under the Rohini Sounding Rocket (RSR) Programme. RH-75, with a diameter of 75mm was the first truly Indian sounding rocket, which was followed by RH-100 and RH-125 rockets. The sounding rocket programme was the bedrock on which the edifice of launch vehicle technology in ISRO could be built. It is possible to conduct coordinated campaigns by simultaneously launching sounding rockets from different locations. It is also possible to launch several sounding rockets in a single day.

Conclusion:

Not only are sounding rocket missions carried out at very low cost, but also the payload can be developed in a very short time frame -- sometimes as quickly as 3 months. This rapid response enables scientists to react quickly to new phenomena (such as observing the Shoemaker-Levy comet impact to Jupiter) and to incorporate the latest, most up-to-date technology in their experiments.

39. What are the factors that have contributed towards India's global leadership role as the vaccine capital? Discuss.

Approach- Candidate is expected to highlight the role of India in vaccine supply to the world. With the help of data and examples, the future of India's vaccine market can be shown.

Introduction

The Indian vaccine market, which has carved out a place for itself at the global level, is expected to reach a valuation of Rs 252 billion by 2025. The Indian market size was Rs 94 billion in 2019. Two coronavirus vaccine candidates, out of a total 11 worldwide, are from India.

Body

What are the factors behind?

- India currently is one of the leading manufacturers and suppliers of vaccines in the world. It solely accounts for around 60% of the total vaccines supplied to the UNICEF.
- Over the years, India has emerged as one of the leading manufacturers of vaccines worldwide, and supplies large quantities of basic and advanced vaccines across the globe. Currently, more than two thirds of the total volume of the vaccines manufactured is exported while the rest is utilised domestically.
- One of the major drivers of the Indian vaccine market is the strong government support to the manufacturers. Steady government funding and successful initiatives have resulted in considerable market development over the years.
- One of the primary forces that is stimulating the market growth is the increasing investments in research and development (R&D) by government funding agencies like the Department of Biotechnology, the Indian Council of Medical Research, and the Ministry of Health and Family Welfare.
- Some of the other factors positively influencing the market growth are increasing population, elevating incomes, improving cold chain logistics and active NGO participation.
- The launch of the Universal Immunization Program (UIP) aimed at increased immunization coverage against vaccine preventable diseases in the country, has also significantly added to the market growth.
- With advancement in technology, the vaccine production capacity along with cold chain storage facilities have also been improved. Besides this, the advent of a number of privately owned firms in India have positively transformed the industry.
- These firms have been making efforts to bring low cost solutions and are increasingly shifting their focus on innovation so as to increase their

revenues. Owing to these factors, India has emerged as a global vaccine manufacturing hub.

- The cost of manufacturing and clinical trials in India is relatively lower than in developed countries.
- Indian vaccines have shown less side effects and are low cost and are easier to store and transport.
- Looking forward, the Indian vaccine market value is projected to reach INR 252 Billion by 2025, expanding at a CAGR of 17.8% during the forecast period (2020-2025).
- Some of the major vaccines being developed are Bacillus Calmette–Guérin (BCG), Haemophilus influenzae type b (Hib), Influenza, Varicella, Typhoid, Japanese Encephalitis, Measles, Tetanus Toxoid, Hepatitis A, Rubella, Diphtheria, Tetanus and Pertussis (DPT), Oral Polio Vaccine (OPV), Measles, Mumps and Rubella (MMR), Rotavirus, Hepatitis B, Pneumococcal, Meningococcal, Rabies, Human Papillomavirus (HPV), Hexavalent and Dengue.

Conclusion

India is a leading force in vaccine development. India has exported more vaccines than the total vaccination at home. With robust infrastructure and government support, India has become a vaccine capital of the world. India is competing with china but with the help of soft diplomacy, India can play a major role in streamlining the vaccine supply to the world.

40. What were the key objectives of the Chandrayaan mission? What were the key learnings from the project?

Approach

Mention the objectives followed by the key learning of the mission.

Introduction

Initial indications are that the premature end to India's Chandrayaan-1 lunar orbiter mission was the result of a miscalculation by scientists at the Indian Space Research Organisation (ISRO) of the thermal stresses the spacecraft would encounter in its operating environment.

Body

The key objectives of the Chandrayaan mission:

- The Chandrayaan-1 mission performed high-resolution remote sensing of the moon in visible, near infrared (NIR), low energy X-rays and high-energy X-ray regions.
- One of the objectives was to prepare a three-dimensional atlas (with high spatial and altitude resolution) of both near and far side of the moon.
- It aimed at conducting chemical and mineralogical mapping of the entire lunar surface for distribution of mineral and chemical elements such as Magnesium, Aluminium, Silicon, Calcium, Iron and Titanium as well as high atomic number elements such as Radon, Uranium & Thorium with high spatial resolution.
- Various mission planning and management objectives were also met. The mission goal of harnessing the science payloads, lunar craft and the launch vehicle with suitable ground support systems including Deep Space Network (DSN) station were realised, which were helpful for future explorations like the MOM.
- Mission goals like spacecraft integration and testing, launching and achieving lunar polar orbit of about 100 km, in-orbit operation of experiments, communication/ telecommand, telemetry data reception, quick look data and archival for scientific utilisation by scientists were also met.

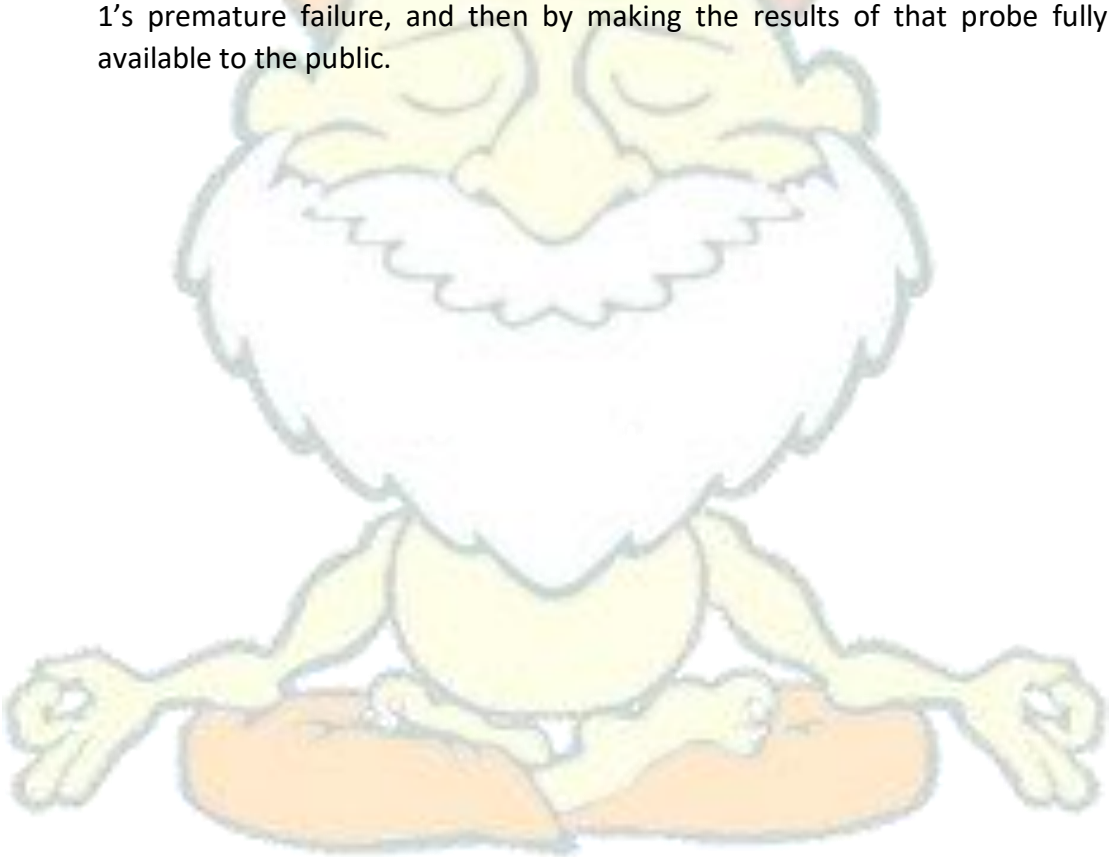
Key learnings from the project:

- The technical error that ultimately doomed Chandrayaan-1 likely could have been avoided given all that has been learned about the lunar-orbit environment through measurements taken by NASA and other space agencies dating back to the 1960s.
- The experience will inform ISRO's future planetary endeavors, just as NASA has had to learn from past mistakes like the measurement-conversion error that led to the Mars Climate Orbiter failure a decade ago this month.

- Hopefully, ISRO also has learned something about managing the disclosure of information about civilian space missions, particularly those involving international partners, even if the news is bad. Unfortunately, Chandrayaan-1 stands out as an example of how not to do it.
- In announcing that Chandrayaan-1's orbit had been raised to 200 kilometers, for example, ISRO said the probe's primary mission had essentially been completed and couched the maneuver as a means of carrying out additional studies. No mention was made of the overheating problem that appears to have been the actual reason for the maneuver.

Conclusion

- ISRO demonstrated its ability to lead an international mission with Chandrayaan-1, and is collaborating with Russia on a follow-on mission that will include a lander and rover. Part of the responsibility that comes with such a leadership role is being forthright and up front with details when things go wrong. ISRO can and should do better. It can start by including representatives of its partner agencies in the investigation of Chandrayaan-1's premature failure, and then by making the results of that probe fully available to the public.



41. Discuss the geopolitics of the Suez Canal during the aftermath of WWII.

Approach:

Question is straight forward in its approach students are expected to write about Suez canal and geopolitics arising out of it during the aftermath of WWII. Also it is important to give a brief about geography of Suez canal in the introduction of the answer.

Introduction:

The Suez Canal is an artificial sea-level waterway running north to south across the Isthmus of Suez in Egypt to connect the Mediterranean Sea and the Red Sea. The canal separates the African continent from Asia, and it provides the shortest maritime route between Europe and the lands lying around the Indian and western Pacific oceans. It is one of the world's most heavily used shipping lanes. The canal is extensively used by modern ships , as it is the fastest crossing from the Atlantic Ocean to the Indian Ocean .Tolls paid by the vessels represent an important source of income for the Egyptian government. The Canal runs between Port Said harbor and the Gulf of Suez , through soils which vary according to the region. At Port Said and the surrounding area, the soil is composed over thousands of years of silt and clay sedimentations deposited by the Nile waters drifted by Damietta branch.

Body:

Geopolitics of Suez canal during the aftermath of WWII-

- Colonel Gamal Abdel Nasser, one of the participants at the conference of non-aligned African and Asian countries held in Bandung in 1955, was seeking to unify the Arab world around Egypt, of which he became President in June 1956. In order to stimulate the economic and agricultural transformation of the country, he planned the construction of a huge dam at Aswan, but the United States, despite seeing Nasser as a preferable alternative to communism, refused to contribute to the enormous building costs. So on 26 July 1956, Nasser announced his intention to nationalise the Suez Canal Company. The majority of shareholders in this internationally vital waterway were French and British, and their concession was not due to expire until 1968. For Nasser, the revenue from operating the canal was necessary to allow Egypt to finance the building of the Aswan Dam.
- France, angered by the aid given by Egypt to the Algerian rebels, and Britain, which wanted to maintain its control over the strategically important Suez passage, decided to launch a joint military attack with a view to regaining control over the administration of the canal. They were supported militarily by Israel — a state that since its creation in 1948 had felt directly threatened by any hint of Arab expansionism or reinforcement. Moreover, Nasser had never stopped proclaiming his desire to destroy Israel. On 29 October 1956, Israeli forces took the Sinai Peninsula, a vital area for the protection of the

Jewish state. One week later, Anglo-French troops disembarked in Port Said. The operation was entirely successful — the Egyptian army was defeated in a few days, even though Nasser had ordered the sinking of some forty ships in order to block the Suez Canal completely.

- However, the world powers did not appreciate the actions of France and Britain in the slightest. The Soviet Union, which was in the process of forcibly putting down the insurrection in Hungary, threatened Paris and London with nuclear reprisals. For their part, the United States, despite being traditional allies of the European powers, complained that they had not been consulted beforehand. They did not appreciate this kind of neo-colonial gunboat diplomacy at all, and exerted enormous financial pressure on the United Kingdom through the United Nations — so much so that the Anglo-French force had to withdraw despite its military success. Israel also evacuated Sinai. The UN took on the task of repairing the Suez Canal, which was reopened to shipping in April 1957. In the meantime, Nasser had ordered the destruction of several oil pipelines, meaning that Western European countries faced their first cuts in fuel supplies.
- The upshot of all this was that Nasser, boosted by his political and diplomatic victory, enjoyed immense prestige in the Arab world. He exploited to the full his image as the victim of an imperialist plot. The European powers were forced to recognise once and for all that they were not world powers and that their role on the international stage could not be more than that of supporting the United States. Indeed, it became difficult for them to pursue an independent policy on the world stage. Their influence in the Middle East became almost non-existent. The Suez Crisis therefore ended in a moral defeat and a diplomatic fiasco for the former colonial powers, while Colonel Nasser consolidated his position as defender of the Arab cause and champion of decolonisation.
- Today, nearly a decade on from the beginning of the Arab Spring, things have changed. It has become necessary for states across the region to reassert themselves and seek to restore stability and economic development. Key to this process will be economic cooperation within the bounds of power politics in two leading geographical areas of the Middle East and North Africa (MENA) region: the Red Sea and the Eastern Mediterranean.
- Both “Saudi Vision 2030” and “Egyptian Vision 2030” place great emphasis on the optimum economic utilization of the Red Sea area, inclusive of the Red Sea’s waters, coastlines, and islands, with all the touristic and mineral resources the sea offers and its potential to serve as a multidimensional bridge between the Arabian Peninsula and Egypt. In fact, Saudi Vision 2030 views the bridge as a means to bolster the Saudi geo-strategic position by extending it to the Eastern Mediterranean via the Suez Canal. It was no coincidence that the agreements signed during the visit by the Saudi monarch to Cairo in April 2016 included a $1.5 billion Sinai development project and a plan to build a King Salman Mosque in Ras Sudr on the eastern shore of the Gulf of Suez.

Conclusion:

About 12% of world trade passes through the canal each year, everything from crude oil to grains to instant coffee. Without Suez, a supertanker carrying Mideast crude oil to Europe would have to travel an extra 6,000 miles around Africa's Cape of Good Hope, adding some $300,000 in fuel costs (although there would be savings from avoiding the Suez passage tolls, which can run hundreds of thousands of dollars.) Because it has no locks, it can even handle aircraft carriers. With this the geostrategic importance of Suez canal has become even more significant which the world powers has realised since the Suez crisis of 1956.

42. The Development Finance Institution holds the potential to give the much needed stimulus to the infrastructure sector. Comment.

Approach:

Students are expected to follow the directive properly and highlight the potential of development finance institution for infrastructure sector by providing detailed explanation to the points.

Introduction:

Development finance institutions are specialized institutions set up primarily to provide development/ Project finance especially in developing countries. These DFIs are usually majority-owned by national governments. The source of capital of these banks is national or international development funds. This ensures their creditworthiness and their ability to provide project finance in a very competitive rate.

Body:

In India, the first DFI was operationalised in 1948 with the setting up of the Industrial Finance Corporation (IFCI). Subsequently, the Industrial Credit and Investment Corporation of India (ICICI) was set up with the backing of the World Bank. The Industrial Development Bank of India (IDBI) came into existence in 1964 to promote long-term financing for infrastructure projects and industry.

Need of Development finance Institutions in India-

- According to the estimates of a recent report – India will require a whopping Rs 50 trillion (US$ 777.73 billion) in infrastructure by 2022 for sustainable development in the country. It is also showcasing a myriad of opportunities for foreign investors to invest in the country's infrastructure development.
- A DFI differs from a commercial bank in that its mandate balances positive development outcomes with profit maximization, often prioritizing the former over the latter. It typically provides necessary financing for activities that are in the realm of public good, but are not lucrative from a financial risk-return perspective, such as environmental projects, long gestation greenfield infrastructure projects and even supporting innovative startups.
- Theoretically, the establishment of a DFI could be justified by the dual existence of massive infrastructure needs and availability of bankable projects.
- The establishment of such an institution is considered as a positive step as banks do not have the long-term funds to finance such projects.
- Banks cannot afford to lend for such projects because that would shrink their lending capacity as the funds get locked up in such projects for that time period.

- Health of banks has been a cause of concern for policy makers because of rising NPAs and the impact of COVID-19 pandemic has made the establishment of specialised infrastructure financing institutions important.
- Successful completion of infrastructure projects is capital intensive and requires a massive capital inflow. The most crucial strategy to stimulate growth in the sector is an effective deployment of capital resources by the government.
- Any sector that needs a strong push needs to identify the roadblocks and come up with a solution for its progress. In the infrastructure industry, one of the biggest hurdles is incomplete projects. These are usually left for too long in the last stage of development and the completion of them would make way for new projects as well as provide support for them. This case is evident especially with physical infra projects such as roadways and railways. Focus on physical infrastructure projects will make the movement of resources easier and also provide aid to logistics.

Conclusion:

India needs DFI's to boost economic growth which would increase capital flows and energize capital markets. To improve long term finances, provide credit enhancement for infrastructure and housing projects. As India does not have a development bank, DFI would fulfil the need for us to have an institutional mechanism.

43. Has India's rail infrastructure been sufficiently utilised to create an integrated transportation network for agricultural produce? Comment. What are the constraints and potential on this front? Examine.

Approach

The question given has two parts and students are expected to address each part equally. In the first part demand of the question is, has rail infrastructure been sufficiently used to create an integrated transportation network for agricultural produce both positive and negative views need to be given as the directive given is comment. In the second part students are expected to mention constraints and potential of the railway infrastructure in transporting agri produce.

Introduction

Indian Railways is among the world's largest rail network, and its route length network is spread over 1,23,236 kms, with 13,523 passenger trains and 9,146 freight trains, plying 23 million travellers and 3 million tonnes (MT) of freight daily from 7,349 stations. India's railway network is recognised as one of the largest railway systems in the world under single management. Indian farmers incur Rs 92,651 crore per year in post-harvest losses, the primary causes of which are poor storage and transportation facilities. There are scarce transport facilities because only a small number of villages are joined by railways and pukka roads to mandi's. As a result, farmers carry their produce to Mandi on either bullock carts or other such means.

Body

Has rail infrastructure been sufficiently used? –

- The movement of food grains has regularly used railways wagons and is an ongoing intervention on freight trains. Since majority of shipments are undertaken by FCI, bulk handling is possible. To compete with roadways and to bring more idle rolling stock into use, railways also developed discounts and incentives for carriage of food grains.
- The agricultural trade, especially in case of perishable commodities, faces a perpetual shortage of time, once the produce is harvested. The agri-logistics of such produce has to resort to technologies such as precooling and cold-chain to enhance the marketable or holding life of the perishable goods because of lack of market access in the normal lifespan of the produce. On the other hand, assured connectivity to market centres is not possible until a certain economy of scale is generated from a single commercial entity.
- Indian farmers incur Rs 92,651 crore per year in post-harvest losses, the primary causes of which are poor storage and transportation facilities. Ironically, according to the high-level Dalwai committee report , an investment of Rs 89,375 crore—a figure marginally lower than the annual

post-harvest losses—is all it takes to improve the state of storage and transportation facilities for food crops.

- Since a market is the primary medium for farmers to exchange their produce for money, lack of logistics connectivity to ensure that their harvest reaches markets in time results in lowering of the farmers' ability to monetise their produce. This becomes even more critical in case of perishable fruits and vegetables.
- At the all-India level, the proportions of the produce that farmers are unable to sell in the market are 34 per cent, 44.6 per cent, and about 40 per cent for fruits, vegetables, and fruits and vegetables combined," finds the committee on Doubling of Farmers' Income. This means, every year, farmers lose around Rs 63,000 crore for not being able to sell their produces for which they have already made investments.
- Although this seems to be a good show on the state of cold storage in the country, but it should be underlined that the existing cold storage capacity is confined mostly to certain crop types and not integrated with other requirements. In fact, close to only 16 per cent of the target set for creating integrated pack-houses, reefer trucks, cold storage and ripening units has been met. This means, there is an overall gap of about 84-99 per cent in achieving the target on improving the state of storage and transportation of the farm produce. Out of these, the country is far-far behind in meeting the requirement of integrated pack-houses, reefer trucks and ripening units.

Use of rail infrastructure and initiatives in this regard –

- Budget 2020 has provided for the implementation of Kisan rails across the country with an intent to boost farmers' welfare by doubling their incomes by 2022.
- The most important among them is the robust network of Indian railways, which cuts through the remotest villages of the country and has helped small farmers get an opportunity to connect to the mainstream market and sell their agricultural produce. Second, the government has allowed a 50 percent subsidy for the transportation costs of fruits and vegetables, thereby, making it economically viable for farmers to transport their produce through the railways rather than the conventional roadways. The Kisan Rails, on an average, save up to 15 hours of travel time and cuts the transportation cost by 1,000 rupees per tonne.
- Further, no minimum price or quantity requirement is set for farmers' consignment, facilitating even the small farmers with lesser quantity of produce to reach the bigger markets. These farmers — who often could not afford the roadways and were cut off from the larger markets owing to logistical and cold storage issues — now find an alternative in the veritable cold storage on the wheels (Kisan Rails).
- Kisan Rails is a step ahead towards transforming the traditional practices of purchase and sale of agricultural produce and exploring new possibilities in agriculture. Further, on the one hand, India today stands as the world's

second largest producer of fruits and vegetables; on the other, it has also been the country that wastes 16 percent of its agricultural produce owing to factors like inadequate logistical support, lack of cold storage facilities, supply chain bottlenecks, and under-developed market channels. The monetary worth of this wastage stands at around US$ 8.3 billion and it uses more than 230 cubic kilometers of water, which is enough to provide drinking water to 100 million people annually. The introduction of Kisan Rails has helped tremendously in reducing wastage, providing a cheaper and safer transport mode, and thereby creating a win-win situation for both the farmers and railways. The Kisan Rails, apart from directly impacting the lives and livelihoods of farmers, have also additionally helped changing smaller railway stations into major farm produce loading hubs. Kisan Rails is emerging as a profitable model for all the stakeholders involved in the process.

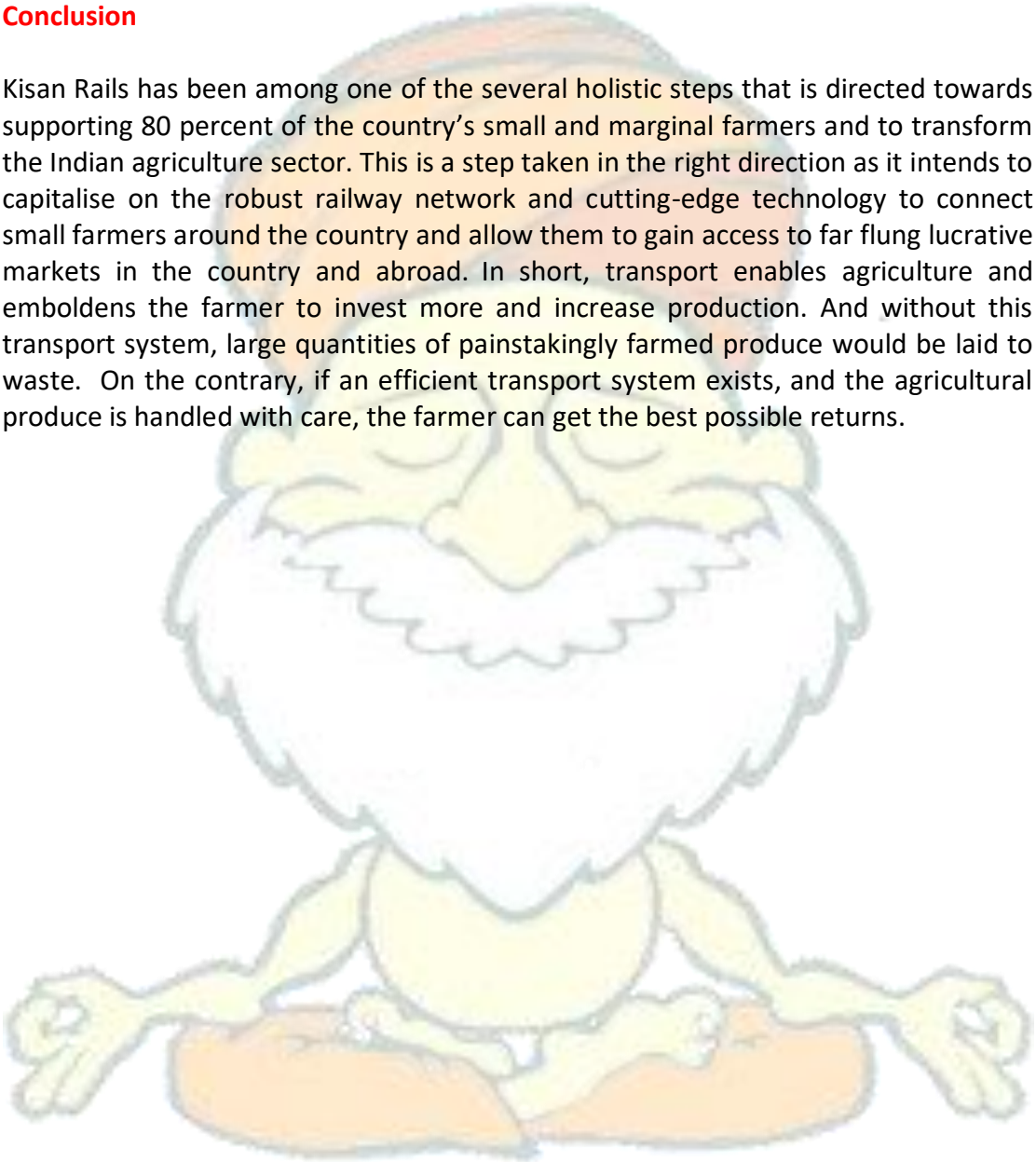
Constraints and potential –

- Lengthy exercise that farmers need to undergo if they want their produce to be transported through the Kisan Rails. The product is handled in their crates at least six times — at the farm, at the source station, while loading it to the train at the source, unloading at the source, at the destination station, and finally at the mandi, resulting in increased chances of wastage of the produce. Efforts to streamline this lengthy exercise could be an instrumental step towards bringing in more traffic for the Kisan Rails.
- Secondly, the cold storage facility in the country needs to significantly improve and more and more stations must have cold storage facilities to maximise the potential of Kisan Rails.
- Overcrowded rail infrastructure makes less apace available for allowing specialized trains to operate on regular basis thus creates another challenge of increasing dedicated agri transport services.
- Cost of rail transport also is high compared to road and other means of transport thus acts a disincentivising factor for the farmers to opt for the rail services to transport their produce to the mandis.
- Railways can play an important role in the coming second green revolution, wherein railheads can locate the modern produce collection centres (or be linked to the same), maintain certain floating stock of containers dedicated for food cargo and to be the backbone to the Unified National Agricultural Markets. Railways not only speeds up the logistics connectivity, which is important in case of perishables, it also covers larger distances which is key to achieving improved value realisation for farmers.
- Indian Railways with its pan-India network is the optimal and preferred choice for Hortiproduce movement. Yet, this burgeoning demand is not fully tapped or planned for in full.
- Assured income from logistics service from agri-hubs. Any producer with efficient and easy access to rail transport will rarely opt for long haul roadways transportation.

- The ability to use railways to cover longer distances in shorter times, empowers farmers by allowing them to expand their market reach. While existing trade into local markets will continue, the amount that is surplus to localised demand can be connected to consumers farther away thereby mitigating loss and increasing recovery from surplus. Otherwise the surplus produced is incurred as total waste.

Conclusion

Kisan Rails has been among one of the several holistic steps that is directed towards supporting 80 percent of the country's small and marginal farmers and to transform the Indian agriculture sector. This is a step taken in the right direction as it intends to capitalise on the robust railway network and cutting-edge technology to connect small farmers around the country and allow them to gain access to far flung lucrative markets in the country and abroad. In short, transport enables agriculture and emboldens the farmer to invest more and increase production. And without this transport system, large quantities of painstakingly farmed produce would be laid to waste. On the contrary, if an efficient transport system exists, and the agricultural produce is handled with care, the farmer can get the best possible returns.



44. To make agriculture the growth engine for rural India, the involvement of the public sector is a must. Do you agree? Critically examine.

Approach

Candidates are expected to write about agriculture growth in India and then critically examine about involvement of public sector to make agriculture the growth engine for rural India.

Introduction

Agriculture continues to be a prime pulse of the Indian economy and is at the core of socio-economic development of the country. It accounts for around 19 per cent of GDP and about two-thirds of the population is dependent on the sector. Indian agriculture has both public and private sector involvement.

Body

Public sector in agriculture is crucial for building necessary infrastructure and investment let us examine how public sector involvement sets a growth engine for rural economy in India.

- Public sector intervention needed in agriculture especially in rural economy to achieve the goal price stability at the time of bumper harvest or below normal production and provide a guaranteed price to producer farmers. Public sector organisations also supply food to vulnerable and poor sections at a lower price.
- The role of infrastructure is crucial for agriculture development in rural India and for taking the production dynamics to the next level. It is only through the development of infrastructure, especially at the post-harvest stage that the produce can be optimally utilized with opportunity for value addition and a fair deal for the farmers.
- To make strengthen growth of rural economy NABARD is facilitating Rs 1 lakh crore finance for funding Agriculture Infrastructure Projects at farm-gate and aggregation points like Primary Agricultural Cooperative Societies, Farmers Producer Organizations, Agriculture entrepreneurs, Startups, etc.
- Local initiative rural level for building community infrastructure, like water harvesting, canal irrigation network, huts for community market centers etc. may generate employment opportunities in this way public sector can revitalise growth engine of rural economy.
- One of the important objectives of public sector is to protect the interest of poor and marginal farmers by abolishing intermediaries through land reforms expanding institutional credit support to poor farmers etc. Credit supply will set growth for rural market economy.
- Government investment to promote agricultural research and training facilities and to percolate the fruits of such research among the rural farmers

by establishing a close linkage between research institutions and rural farmers can be beneficial.

However these central and state government initiatives and subsidies are concentrated on a few crops and still too heavily subsidised in favour of the big players therefore there is need to diversify the source of investments.

- Involvement should be encouraged from private investment in agriculture it is made either for augmenting productivity of natural resources or for undertaking such activities, which supplement income sources of farmers. Private sector investment includes investments made by private corporates and households.
- The corporate sector investment includes investment by organised corporate bodies like big private companies and unorganised entities like sugar co-operatives and milk co-operatives.
- The household sector investment comprises investment on farm equipments, machinery, irrigation, land improvement and land reclamation. With about 90 per cent share, households dominate the private investment scene. These investments enable farmers to grow existing crops more productively and intensively and take up non-conventional/high value crops.
- The public investment in agriculture has been declining and is one of the main reasons behind the declining productivity and low capital formation in the agriculture sector. With the burden on productivity-driven growth in the future, this worrisome trend needs a reversal.
- Technological innovation by Private agribusiness companies are at the forefront of heavy investment in agricultural R&D and technological innovation. Eg: Trithi Robotics uses drone technology to allow farmers to monitor crops remotely.
- Private player also lead in seed treatment, agricultural chemicals, biologicals, plant growth regulation, animal genetics and health, biofuels, machinery, irrigation, soil analysis and data-intensive precision farming tools.
- The private sector's milk processing capacity grew steadily since deregulation, and in 2012-2013 was 70 percent greater than that of cooperatives.
- Sales of the private processing sector and food services industry are growing rapidly. Performance and market shares of the formal food processing industry exceed those of the more traditional "unorganized".

Conclusion

The idea is to modernise the agriculture sector through conscious investments and bring down the ICOR and thereby allow the agriculture sector to perform well like industrial sector. Investment in agriculture, the prime mover needs to be accelerated to achieve the desired level of growth of over 4 per cent per annum and 5 trillion economy in future.

45. What are the potential strategic implications of artificial intelligence? Discuss.

Approach

As the derivative is discuss so it necessitates a debate where reasoning is backed up with evidence to make a case for and against an argument and finally arriving at a conclusion.

Introduction

An AI Strategy defines your AI priorities, goals, milestones, mission, and vision. An AI Strategy focuses on the AI implementation of technology goals while a business strategy focuses on the execution of corporate goals. AI Strategies are being used in corporations around the world and are taking the world by storm. From self-driving cars to health biometrics - from predictive equipment failure to Netflix algorithms - the impact of AI is rippling across an expanding range of industries.

Body

POTENTIAL STRATEGIC IMPLICATIONS OF ARTIFICIAL INTELLIGENCE –

- Artificial intelligence can dramatically improve the efficiencies of our workplaces and can augment the work humans can do.
- When AI takes over repetitive or dangerous tasks, it frees up the human workforce to do work they are better equipped for—tasks that involve creativity and empathy among others.
- Although it could take a decade or more to perfect them, autonomous cars will one day ferry us from place to place.
- AI powered robots work alongside humans to perform a limited range of tasks like assembly and stacking, and predictive analysis sensors keep equipment running smoothly.
- In the comparatively AI-nascent field of healthcare, diseases are more quickly and accurately diagnosed, drug discovery is sped up and streamlined, virtual nursing assistants monitor patients and big data analysis helps to create a more personalized patient experience.
- Textbooks are digitized with the help of AI, early-stage virtual tutors assist human instructors and facial analysis gauges the emotions of students to help determine who's struggling or bored and better tailor the experience to their individual needs.
- Journalism is harnessing AI, too, and will continue to benefit from it. Bloomberg uses Cyborg technology to help make quick sense of complex financial reports.
- Last but hardly least, Google is working on an AI assistant that can place human-like calls to make appointments at, say, your neighbourhood hair salon. In addition to words, the system understands context and nuance.

Already much has been made of the fact that AI's reliance on big data is already impacting privacy in a major way. as is the case with most emerging technology, there is a real risk that commercial and state use has a detrimental impact on human rights. However, if implemented responsibly, AI can benefit society.

Conclusion

One may think that AI systems will likely achieve superhuman performance in more and more domain-specific tasks, but not across all domains at the same time, which makes it a gradual process rather than an intelligence explosion. But of course, one cannot justify high confidence in these views given that many experts disagree. One of the absolute prerequisites for AI to be successful in many areas is that we invest tremendously in education to retrain people for new jobs. More generally, one of the best ways to handle pervasive uncertainty may be to focus on "meta" activities such as increasing the influence of effective altruists in the AI community by building expertise and credibility. This is valuable regardless of one's views on AI scenarios."

46. What is deepfake? How can it be a security challenge? Examine.

Approach

Candidates are expected to write about basics of deepfake. And then highlight the Security challenges due to deepfake. Also can suggest the possible solution to tackle it.

Introduction

Deep fakes first came into notice in 2017 when a Reddit user posted explicit videos of celebrities. After that several instances have been reported. Deep fakes are computer-generated images and videos. Cybercriminals use AI softwares to superimpose a digital composite (assembling multiple media files to make a final one) onto an existing video, photo or audio.

Body

Deepfake as Security challenge:

- Undermining Democracy: A deepfake can also aid in altering the democratic discourse and undermine trust in institutions and impair diplomacy. False information about institutions, public policy, and politicians powered by a deepfake can be exploited to spin the story and manipulate belief.
- Disrupting Electioneering: A high-quality deepfake can inject compelling false information that can cast a shadow of illegitimacy over the voting process and election results. Leaders can also use them to increase populism and consolidate power. Deepfakes can become a very effective tool to sow the seeds of polarisation, amplifying division in society, and suppressing dissent.
- Anti state sentiment: Nation-state actors with geopolitical aspirations, ideological believers, violent extremists, and economically motivated enterprises can manipulate media narratives using deepfakes. It can be used by insurgent groups and terrorist organisations, to represent their adversaries as making inflammatory speeches or engaging in provocative actions to stir up anti-state sentiments among people.
- Creation of Echo Chambers in Social Media: Falsity is profitable, and goes viral more than the truth on social platforms. Combined with distrust, the existing biases and political disagreement can help create echo chambers and filter bubbles, creating discord in society.
- Liar's dividend: An undesirable truth is dismissed as deepfake or fake news. It can also help public figures hide their immoral acts in the veil of deepfakes and fake news, calling their actual harmful actions false.
- Social Harm: Deepfakes can cause short- and long-term social harm and accelerate the already declining trust in news media. Such an erosion can contribute to a culture of factual relativism.

- Targeting Women: The malicious use of a deepfake can be seen in pornography, inflicting emotional, reputational, and in some cases, violence towards the individual.
- Damage to Personal Reputation: Deepfake can depict a person indulging in antisocial behaviours and saying vile things. These can have severe implications on their reputation, sabotaging their professional and personal life. Further, Deepfakes can be deployed to extract money, confidential information, or exact favours from individuals.

What should be the solution for dealing with Deepfakes?

- Regulation & Collaboration with Civil Society: Meaningful regulations with a collaborative discussion with the technology industry, civil society, and policymakers can facilitate disincentivising the creation and distribution of malicious deepfakes.
- Detect and amplify: We also need easy-to-use and accessible technology solutions to detect deepfakes, authenticate media, and amplify authoritative sources.
- New Technologies: There is also need easy-to-use and accessible technology solutions to detect deepfakes, authenticate media, and amplify authoritative sources.
- Enhancing Media Literacy: Media literacy for consumers and journalists is the most effective tool to combat disinformation and deep fakes. Improving media literacy is a precursor to addressing the challenges presented by deepfakes.
- To counter the menace of deepfakes, we all must take the responsibility to be a critical consumer of media on the Internet, think and pause before we share on social media, and be part of the solution to this infodemic.

Conclusion

Collaborative actions and collective techniques across legislative regulations, platform policies, technology intervention, and media literacy can provide effective and ethical countermeasures to mitigate the threat of malicious deepfakes.

47. How do hybrid vehicles work? Are hybrid vehicles a sustainable alternative to traditional automobile? If yes, then what are the challenges in their wide scale adoption? Discuss.

Approach- Question is straight forward. Candidate is expected to define hybrid vehicles, explain how they function. Challenges in their adoption can be given by given by explaining pros and cons.

Introduction

A hybrid combines at least one electric motor with a gasoline engine to move the car, and its system recaptures energy via regenerative braking. Sometimes the electric motor does all the work, sometimes it's the gas engine, and sometimes they work together. The result is less gasoline burned and, therefore, better fuel economy. Adding electric power can even boost performance in certain instances.

Body

How do hybrid vehicles work?

- The basic principle with hybrid vehicles is that the different motors work better at different speeds; the electric motor is more efficient at producing torque, or turning power, and the combustion engine is better for maintaining high speed (better than a typical electric motor).
- Switching from one to the other at the proper time while speeding up yields a win-win in terms of energy efficiency, as such that translates into greater fuel efficiency.
- Regenerate braking- The drivetrain can be used to convert kinetic energy (from the moving car) into stored electrical energy (batteries). The same electric motor that powers the drivetrain is used to resist the motion of the drivetrain. This applied resistance from the electric motor causes the wheel to slow down and simultaneously recharge the batteries.
- Dual power- Power can come from either the engine, motor, or both depending on driving circumstances. Additional power to assist the engine in accelerating or climbing might be provided by the electric motor. Or more commonly, a smaller electric motor provides all of the power for low-speed driving conditions and is augmented by the engine at higher speeds.

Are they sustainable alternative to traditional automobile?

- Traditional automobile gives better power, low Economic price tag, have Low maintenance cost, have better agility (acceleration and speed).
- On the other hand, hybrid vehicles give higher mileage, they are cleaner, have higher resale value and reduce fuel dependence but they are high on maintenance.

What are the challenges for the wide scale adoption?

- Though hybrid cars consume less fuel than conventional cars, there is still an issue regarding the environmental damage of the hybrid car battery.
- Today most hybrid car batteries are one of two types: 1) nickel metal hydride, or 2) Lithium-ion; both are regarded as more environmentally friendly than lead-based batteries which constitute the bulk of petrol car starter batteries today.
- There is an impending increase in the costs of many rare materials used in the manufacture of hybrid cars. For example, the rare earth element dysprosium is required to fabricate many of the advanced electric motors and battery systems in hybrid propulsion systems.
- Neodymium is another rare earth metal which is a crucial ingredient in high-strength magnets that are found in permanent magnet electric motors. Nearly all the rare earth elements in the world come from China. Overdependence on china is major cause of concern in uncertain times of pandemic.
- In order for the hybrid to run on electrical power, the car must perform the action of braking in order to generate some electricity. The electricity then gets discharged most effectively when the car accelerates or climbs up an incline.
- In 2014, hybrid electric car batteries can run on solely electricity for 70–130 miles (110–210 km) on a single charge. Hybrid battery capacity currently ranges from 4.4 kWh to 85 kWh on a fully electric car. On a hybrid car, the battery packs currently range from 0.6 kWh to 2.4 kWh representing a large difference in use of electricity in hybrid cars making electric vehicles more attractive.

Conclusion

Hybrid vehicles present an optimistic alternative to traditional vehicle, in terms of saving fuel and energy, but adoption rate of hybrid vehicles is low owing to high price and high maintenance cost. Electric vehicles are occupying market at faster pace, to increase mass appeal above challenges can be addressed.

48. What are the key issues with the issuance and regulation of electoral bonds in India? Examine.

Approach:

Question is straight forward in its approach students are expected to write about the issues of electoral bonds and the issues associated with their issuance and regulation also it is important to mention points with proper explanation.

Introduction:

Electoral bonds are interest-free bearer instruments used to donate money anonymously to political parties. A bearer instrument does not carry any information about the buyer or payee and the holder of the instrument (which is the political party) is presumed to be its owner. The bonds are sold in multiples of Rs 1,000, Rs 10,000, Rs 1 lakh, Rs 10 lakh, and Rs 1 crore, and the State Bank of India (SBI) is the only bank authorised to sell them. Donors can purchase and subsequently donate the bonds to their party of choice, which the party can then cash through its verified account within 15 days. There is no limit on the number of bonds an individual or company can purchase. SBI deposits bonds that a political party hasn't enchased within 15 days into the Prime Minister's Relief Fund.

Body:

Issues with Issuance and regulation of electoral bonds-

- The anonymity provided to donors donating electoral bonds is the point of contention here. Through an amendment to the Finance Act 2017, the Union government has exempted political parties from disclosing donations received through electoral bonds. In other words, they don't have to disclose details of those contributing by way of electoral bonds in their contribution reports filed mandatorily with the Election Commission every year.
- Moreover, while electoral bonds provide no details to the citizens, the said anonymity does not apply to the government of the day, which can always access the donor details by demanding the data from the State Bank of India (SBI). This implies that the only people in dark about the source of these donations are the taxpayers.
- Compromising Right To Know, The Indian Supreme Court has long held that the "right to know", especially in the context of elections, is an integral part of the right to freedom of expression under the Indian Constitution.
- By keeping this knowledge from citizens and voters, the electoral bonds scheme violates fundamental tenets of our democracy.
- Opposition by Election Commission of India The Election Commission, in May 2017, objected to the amendments in the Representation of the People (RP) Act, which exempt political parties from disclosing donations received through electoral bonds. It described the move as a "retrograde step".

- The electoral bonds scheme removes all pre-existing limits on political donations and effectively allows well-resourced corporations to fund elections and subsequently paving the way for crony capitalism.
- Further, as the electoral bonds scheme allows even foreign donations to political parties (which can often be made through shell companies) the prospects of institutional corruption increase with the electoral bonds scheme, instead of decreasing.
- The essential problem with the electoral bonds is that it obscures the real extent of the rot in political funding. Formally accounted for funds, whether as donations in cash, cheque or electoral bonds, constitute a tiny fraction of the actual expenditure of a political party. The bulk of the money is received and spent completely informally and not reported to any authority.

Way forward:

- Transparency in Elections Funding, In many advanced countries, elections are funded publicly. This ensures principles of parity and there is not too great a resource gap between the ruling party and the opposition.
- One of the most critical functions of an independent judiciary in a functioning democracy is to referee the fundamentals of the democratic process.
- Electoral bonds have raised questions on the electoral legitimacy of the government and thus the whole electoral process has become questionable. In this context, the courts should act as an umpire and enforce the ground rules of democracy.

Conclusion:

India cannot forever fund its democracy with the proceeds of corruption, money taken off the books of companies and funnelled to parties in wholly opaque ways. Such funding corrupts politics and makes the economy non-competitive. If project costs are routinely padded to siphon funds out during project implementation, so as to create the war chest with which to pay off parties. It is essential that if democracy is to thrive, the role of money in influencing politics ought to be limited. Thus, it is imperative that the scheme of the electoral bonds should be revised.

49. Examine the applications of nanotechnology in biomedicine?

Approach:

Question is straight forward in its approach students are expected to write about nanotechnology anf its applications in biomedicine.

Introduction:

Nanotechnology is a field of research and innovation concerned with building 'things' - generally, materials and devices - on the scale of atoms and molecules. A nanometre is one-billionth of a metre: ten times the diameter of a hydrogen atom. The diameter of a human hair is, on average, 80,000 nanometres. At such scales, the ordinary rules of physics and chemistry no longer apply. For instance, materials' characteristics, such as their colour, strength, conductivity and reactivity, can differ substantially between the nanoscale and the macro. Carbon 'nanotubes' are 100 times stronger than steel but six times lighter. Nanotechnology is hailed as having the potential to increase the efficiency of energy consumption, help clean the environment, and solve major health problems. It is said to be able to massively increase manufacturing production at significantly reduced costs

Body:

Applications of nanotechnology in biomedicine-

- Nanomaterials have been used in diagnosis mostly as contrast agent in molecular imaging. They are usually in small size and of much higher surface area to volume ratio, thus their surface can be decorated with more therapeutic molecules, imaging agents, targeting ligands, and nucleic acids. When used as contrast agents, they can circulate in the blood for longer time with higher sensitivity and possibly fewer side-effects.
- Magnetic resonance imaging (MRI) provides superior contrast in soft tissue imaging and has no radiation. Compared with gadolinium-based MRI contrast agents, nanoparticle MRI contrast agents circulate longer in the blood, and have higher sensitivity and fewer side-effects.
- Nanomaterials have been introduced to the therapy of multiple diseases, including drug delivery system and nanodrugs. Drug delivery is one of the typical applications of
- nanomaterials in medicine. For example, tumor targeting, imaging and drug delivery can be accomplished by administrated gold nanoparticles and nanorods, iron oxide nanoworms and drug loaded liposomes. Some other nanomaterials can be used to decorate gold nanoparticles to improve the capability. The nanotechnology has also been applied to the intelligent drug-delivery systems and implantable drug-delivery systems, so as to realize the controlled and targeted release of therapeutic drugs. Besides drug delivery, nanomaterials have been adopted in some specific tumor therapies.

- The application of nanotechnology has opened a new realm in the advance of regenerative medicine. The development of nanotechnology offers more opportunities of applying stem cells in the regeneration of tissues and organs.
- The physical and chemical properties of carbon nanotubes (CNTs) have motivated their application in several areas of science. Modification of the surface of these particles and their functionalization with biological molecules at the molecular level has increased their use in nanobiotechnology. These modified particles provide well-dispersed samples that are compatible with physiological condition. In this context, nanotubes might be useful drug delivery vehicles because their nanometer size enables them to move easily inside the body.
- Nanotechnology has also found applications in tissue and implant engineering. The possibility to enhance the surface area of the material and to tune the roughness of its surface at the nanometric scale should yield better biological responses of osteogenic cells and effective mechanical contact between tissue and implant.
- The addition of bioactive minerals inspired by the bone structure has been one of the most commonly used strategies to modify metallic surfaces of the implant. Biomimetics is a desirable strategy because it predefines nanochemical and/or nanophysical structures.

However the Biosafety is mostly concerned in nanotechnological applications. It is important to better understanding the metabolic fate and biological effect in cells or organs as increasing nanomaterials are hopeful materials to be applied in medicine. The toxicity of most nanomaterials applied in biomedicine has been examined in preclinical research in that the low toxicity and optimal biocompatibility are necessary for their clinical applications.

Conclusion:

Products of nanotechnology will be smaller, cheaper, lighter yet more functional and require less energy and fewer raw materials to manufacture, claim nanotech advocates. Establishing the real effect of nanomaterials in biological systems is a challenging task. Nonetheless, in order to take advantage of the potential application of nanomaterials to medicine, a detailed understanding of their potential toxicity is necessary. However, the relationship between toxicity and physicochemical properties should always be interpreted cautiously to minimize false results.

50. How does India's IPR regime balance domestic interests with global trade concerns at forums like the WTO? Examine.

Approach

Candidates are expected to write about India's IPR regime and then examine how India balance its domestic interest with global trade concerns such as on global forum like WTO.

Introduction

Intellectual property rights (IPR) are the rights given to persons over the creations of their minds: inventions, literary and artistic works, and symbols, names and images used in commerce. They usually give the creator an exclusive right over the use of his/her creation for a certain period of time.

Body

India's IPR regime:

- The National Intellectual Property Rights (IPR) Policy 2016 as a vision document to guide future development of IPRs in the country. It sets in place an institutional mechanism for implementation, monitoring and review. It aims to incorporate and adapt global best practices to the Indian scenario.
- CIPAM, setup under the aegis of DIPP, is to be the single point of reference for implementation of the objectives of the National IPR Policy.

Balancing domestic interest with global trade:

- Rameshwari Photocopy case: International publishers against a photocopy shop on Delhi University's (DU) campus in order to determine whether or not copyrighted material was being used in the course of instruction. Delhi HC upheld the shop's right to photocopy course material for students.
- This is a landmark verdict as photocopies provides for huge part of students course demands in India due to its easy availability and affordability. But Discourages international publishers in Indian market.
- India's first ever compulsory license was granted by the Patent Office on March 9, 2012, to Natco Pharma for the generic production of Bayer Corporation's Nexavar, a life saving medicine used for treating Liver and Kidney Cancer. Bayers sold this drug at exorbitant rates, with one month's worth of dosage costing around Rs 2.8 Lakh. Natco Pharma offered to sell it around for Rs 9000, making it affordable for people belonging to every stratum.
- Moreover TRIPS and Doha Declaration considered compulsory license as an important provision so as to provide health benefits to the people without any discrimination on the basis of color, caste, creed or even country. CL is permitted under the WTO's TRIPS (IPR) Agreement provided conditions such as 'national emergencies, other circumstances of extreme urgency and anti-competitive practices' are fulfilled.

- Recognizing the bias in international law, the Indian Protection of Plant Varieties and Farmers' Rights (PPV&FR) entitles not just the breeder but also the farmer.
- IPR policy is driven by the agenda of IP maximalism, where IP owners' rights will be maximised at the cost of public interest. This (policy) will influence courts and judges who might consider rights of patentees above that on common man in certain cases.
- Not understanding the modes of creativity and sharing in "shadow economy ", the policy leans towards superimposition of formal IP framework.
- The National IPR Policy insistently makes the case for defensive measures, or measures which are primarily targeted at preventing IPR claims on traditional knowledge being granted to unauthorised entities.
- In its latest Special 301 report released by the United States Trade Representative (USTR), the US termed India as "one of the world's most challenging major economies" with respect to protection and enforcement of IP.
- Foreign investors and MNCs allege that Indian law does not protect against unfair commercial use of test data or other data submitted to the government during the application for market approval of pharmaceutical or agro-chemical products.
- While the National IPR Policy makes the right noises when it refers to the need to engage constructively in the negotiation of international treaties and agreements in consultation with stakeholders such a pronouncement has to be backed by concerted action to defend the interests of the country and its people in a proactive fashion.
- Experts says Indian IPR regime is innovation in itself and it is prototyped by many other developing countries. The recent issues and controversies shows India needs continuous revision and fine tuning of policies to have right balance between interests of common people and investors/technologists.

Conclusion

India has made a number of changes in its IPR regime to increase efficiency and has cut down the time required to issue patents. The culture of innovation is taking centre stage in the country. An efficient and equitable intellectual property system can help all countries to realize intellectual property's potential as a catalyst for economic development and social & cultural well-being.

51. What are India's strategic interests in having a friendly and peaceful Bangladesh?

Approach- Question is straight forward. Candidate can outline strategic importance of Bangladesh in the context of recent bilateral developments and give future roadmap of engagements to bolster the relationship.

Introduction

There is no country integrated more closely with India than Bangladesh in respect of language, ethnicity and culture. Its location is surrounded by India save for its coastline and a small border of 193 kilometre with Myanmar. The only religious difference drives the relationship to unusual degree.

Body

Recently Indian prime minister visited Bangladesh. The visits have been timed with celebrations to mark 50 years of the 1971 liberation war that led to the birth of Bangladesh. The prestigious Gandhi peace prize was awarded to sheikh Mujibur Rehman on his birth anniversary.

India's strategic interests with Bangladesh

- Strategic partnership is defined as anything relating to long term interests and goals; a strategic partnership, by extension, would relate to long term shared interests and ways of achieving them.
- Strategic partnerships are commonly associated with defence or security related issues, a wide range in bilateral relations, from defence to education, health and agriculture, and quite commonly, economic relations, including trade, investment and banking.
- Bangladesh is expected to cross India in terms per capita income. This speaks volumes about the achievements of Bangladesh when contrasted with Pakistan. At the same time, it has several implications for the region.
- Rapid and sustained economic growth in Bangladesh has begun to alter the world's perception of the subcontinent. India and Pakistan dominated the region and other countries were considered small. The economic rise of Bangladesh is changing some of that.
- Bangladesh's economic growth can accelerate regional integration in the eastern subcontinent. Instead of merely praying for the revival of Saarc, Delhi could usefully focus on the BBIN.
- Bilateral trade between India and Bangladesh stood at US$6.6 billion in 2013–14 with India's exports at US$6.1 billion and imports from Bangladesh at US$462 million. The trade is set to go at $10 billion by 2018 through ports only.
- The economic success of Bangladesh is drawing attention from a range of countries in East Asia, including China, Japan, South Korea, and Singapore.

The US, which traditionally focused on India and Pakistan, has woken up to the possibilities in Bangladesh.

North east and Bangladesh

- Bangladesh's economy is now one-and-a-half times as large as that of West Bengal; better integration between the two would provide a huge boost for eastern India.
- Also, connectivity between India's landlocked Northeast and Bangladesh would provide a boost to the development of north-eastern states. Delhi and Dhaka are eager to promote greater cooperation, but there has been little political enthusiasm in Kolkata.

Blue economy

- Both countries are looking at strengthening economic cooperation through joint investments and cooperation under the 'Blue Economy' programme.
- The programme entails synergized efforts of littoral states in the exploration of hydrocarbons, marine resources, deep-sea fishing, preservation of marine ecology and disaster management.
- The industry in India needs to look for opportunities for collaboration in defence, such as in military hardware, space technology, technical assistance, exchange of experience, and development of sea infrastructure.

Challenges ahead

- Despite the friendship remaining solid, the border has been sensitive. At least 25 Bangladeshis were killed in the first six months of this year along the border by Indian forces, according to a rights watchdog.
- The Teesta water dispute between West Bengal and Bangladesh remains unresolved.
- The Citizenship (Amendment) Act and the proposed National Register of Citizens, which Ms Hasina called "unnecessary", have created a negative impression about India.
- China is making deep inroads into Bangladesh by ramping up infrastructure investments and expanding economic cooperation. Bangladesh is overwhelmingly dependent on China for military hardware.
- Since 2010, India approved three Lines of Credit to Bangladesh of $7.362 billion to finance development projects. But, just $442 million have been disbursed until December 2018.

Conclusion

It is imperative for India to bolster ties with this all-weather friend, and there may not be a better time to do so than when Bangladesh is to celebrate the golden jubilee of its independence. Initiatives like maitri setu reaffirms strategic importance of Bangladesh. New Delhi should take a broader view of the changing scenario and growing competition in South Asia, and reach out to Dhaka with an open mind.

52. Examine the issue of marine pollution with special focus on plastics. How does plastic waste threaten the oceans? Discuss.

Approach- Candidate can define the marine pollution and focussing on the role of plastics in causing the same. With the help of data and citing important conventions in this regard, a way forward can be given to tackle this menace.

Introduction

Marine pollution is a combination of chemicals and trash, most of which comes from land sources and is washed or blown into the ocean. This pollution results in damage to the environment, to the health of all organisms, and to economic structures worldwide.

Body

Marine pollution and plastics

- Over 300 million tons of plastic are produced every year for use in a wide variety of applications.
- At least 8 million tons of plastic end up in our oceans every year, and make up 80% of all marine debris from surface waters to deep-sea sediments. Marine species ingest or are entangled by plastic debris, which causes severe injuries and deaths.
- Floating plastic debris are currently the most abundant items of marine litter. Plastic has been detected on shorelines of all the continents, with more plastic materials found near popular tourist destinations and densely populated areas.

How does plastic threaten the oceans?

- The most visible and disturbing impacts of marine plastics are the ingestion, suffocation and entanglement of hundreds of marine species. Marine wildlife such as seabirds, whales, fishes and turtles, mistake plastic waste for prey, and most die of starvation as their stomachs are filled with plastic debris. They also suffer from lacerations, infections, reduced ability to swim, and internal injuries.
- Invisible plastic has been identified in tap water, beer, salt and are present in all samples collected in the world's oceans, including the Arctic. Several chemicals used in the production of plastic materials are known to be carcinogenic and to interfere with the body's endocrine system, causing developmental, reproductive, neurological, and immune disorders in both humans and wildlife.
- Toxic contaminants also accumulate on the surface of plastic materials as a result of prolonged exposure to seawater. When marine organisms ingest plastic debris, these contaminants enter their digestive systems, and overtime accumulate in the food web. The transfer of contaminants between

marine species and humans through consumption of seafood has been identified as a health hazard, but has not yet been adequately researched.
- Plastic, which is a petroleum product, also contributes to global warming. If plastic waste is incinerated, it releases carbon dioxide into the atmosphere, thereby increasing carbon emissions.

What can be done?

- Recycling and reuse of plastic materials are the most effective actions available to reduce the environmental impacts of open landfills and open-air burning that are often practiced to manage domestic waste.
- Governments, research institutions and industries also need to work collaboratively redesigning products, and rethink their usage and disposal, in order to reduce microplastics waste from pellets, synthetic textiles and tyres. This will require solutions which go beyond waste management, to consider the whole lifecycle of plastic products, from product design to infrastructure and household use.
- Legal efforts like 1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (or the London Convention), the 1996 Protocol to the London Convention (the London Protocol), and the 1978 Protocol to the International Convention for the Prevention of Pollution from Ships (MARPOL) have been made but there is little compliance due to limited financial resources to enforce them.
- The United Nations Environment Program (UNEP) considers plastic marine debris and its ability to transport harmful substances as one of the main emerging issues affecting the environment. At the 2015 G7 summit in Bavaria, Germany, the risks of microplastics were acknowledged in the Leaders' Declaration.

Conclusion

The world's oceans – their temperature, chemistry, currents and life - drive global systems that make the Earth habitable for humankind. Over three billion people depend on marine and coastal biodiversity for their livelihoods. We must treat plastic pollution as serious threat to humanity, ocean health must be treated as a global issue and all nations should act in concert to implement Sustainable Development Goal: 14 i.e. To conserve and sustainably use the oceans, seas and marine resources for sustainable development.

53. How does mining affect the local ecology? Illustrate. Discuss various sustainable methods of mining.

Approach

The candidate needs to illustrate upon how mining affects the local ecology in the first part of the answer while in the second part, discussing various sustainable methods of mining is the demand.

Introduction

Mining is considered as one of the necessary evils of the modern world, which provides the materials required to sustain quality of life. While improving the quality of life and giving an impetus to economic development, it has also brought in its wake, a notable impact on the environment as well as socio-economic conditions of local people.

Body

Mining is the extraction of valuable minerals or other geological materials from the earth, from an ore body, vein or seam. Developing regions with large mineral deposits confront a challenge in striking the right balance between exploiting the mineral resources for economic prosperity and safeguarding environmental stability. In this regard, effects of mining on the local ecology include –

- By nature, mining involves the production of large quantities of waste, in some cases contributing significantly to a nation's total waste output. The amount of waste produced depends on the type of mineral extracted, as well as the size of the mine.
- Erosion from waste rock piles or runoff after heavy rainfall often increases the sediment load of nearby water bodies. In addition, mining may modify stream morphology by disrupting a channel, diverting stream flows, and changing the slope or bank stability of a stream channel which can reduce water quality.
- Acid drainage is one of the most serious environmental impacts associated with mining. Acidic water may subsequently leach other metals in the rock, resulting in the contamination of surface and groundwater.
- The release of metals into the environment due to mining has its ill effects. While small amounts of heavy metals are considered essential for the survival of many organisms, large quantities are toxic.
- Habitat fragmentation occurs when large areas of land are broken up into smaller and smaller patches, making dispersal by native species from one patch to another difficult or impossible, and cutting off migratory routes.
- The most obvious impact to biodiversity from mining is the removal of vegetation, which in turn alters the availability of food and shelter for

wildlife. At a broader scale, mining may impact biodiversity by changing species composition and structure.

India had a vision to incorporate sustainability in this sector at least almost a decade ago, even before the 2015 United Nations Sustainable Development Goals (SDGs). Sustainable mining activities are integral to many of the SDGs. Here, various sustainable methods of mining are –

- **Reduce resources inputs for effective mining practices:** Becoming more environmentally sustainable is to reduce the input of the mine. By diverting surface water and pumping groundwater, mines can reduce both the quantity and quality of water available downstream.
- **Improving the efficiency of mining processes:** Companies can improve its efficiency where its lacking in terms of sustainability and green mining initiatives, improving the efficiency of this process can help trim down environmental impact.
- **Reusing Mining Waste**: Mining naturally produces significant amounts of waste — such as tailings, rocks and wastewater. In many cases, businesses leave waste behind when mining operations cease. But for almost every category of mining waste, there are at least one or two ways to reuse that waste on- or off-site.
- **Eco-friendly Equipment**: Battery-driven mining equipment is often powerful enough to replace diesel-driven options. Replacing diesel engines with electric engines where possible can significantly reduce the amount of CO2 produced by mining operations.
- **Rehabilitating Mining Sites**: Many former mine sites are left unproductive, unusable by landowners and, in some cases, almost entirely inhospitable to plant and animal life. However, this damage isn't guaranteed to be permanent. Companies can use many land rehabilitation techniques to make mined land productive again or speed up the land's natural recovery process.

The National Mineral Policy 2019 emphasised that environmental, economic and social considerations must be taken into account as early as possible in the decision-making process so that mining is financially viable, socially responsible, environmentally, technically and scientifically sound, uses mineral resources optimally and ensures sustainable post-closure land uses.

Conclusion

Despite recent strides and new technology, the mining industry remains unsustainable in many areas. Not all of the technologies are economical yet. However, the mining industry as a whole does seem to be moving in the direction of sustainability where future seems promising.

54. Discuss the key principles of environmental impact assessment (EIA)? Is it impractical to adhere to these principles in real life? Critically examine.

Approach:

Candidates are expected to write about Environment impact assessment, also critically examine whether it is impractical to adhere to these principles in real life.

Introduction

UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers.

Body

Importance of principles of the EIA:

- EIA links environment with development for environmentally safe and sustainable development. EIA provides a cost effective method to eliminate or minimize the adverse impact of developmental projects.
- EIA enables the decision makers to analyse the effect of developmental activities on the environment well before the developmental project is implemented. EIA encourages the adaptation of mitigation strategies in the developmental plan.
- EIA makes sure that the developmental plan is environmentally sound and within the limits of the capacity of assimilation and regeneration of the ecosystem.
- Positive and negative, reversible and irreversible and temporary and permanent impacts are predicted which presupposes a good understanding of the project by the assessment agency.
- Environment Impact Assessment Notification of 2006 has decentralized the environmental clearance projects by categorizing the developmental projects in two categories, i.e., Category A (national level appraisal) and Category B (state level appraisal).

Difficulty and shortcomings in adherence to the principles in reality:

- Lack of awareness among the local people about the process of EIA, its significance for them, their own rights and responsibilities. Most of the time EIA reports are unavailable in local languages, thus local people are unable to decipher the reports, and are misled by the proponents.
- It has been found that the team formed for conducting EIA studies is lacking the expertise in various fields such as environmentalists, wildlife experts, Anthropologists and Social Scientists.

- The Draft Environmental Impact Assessment Notification 2020 has inverted the logic of 'precautionary principle' which forms the bedrock of India's environmental outlook. It seeks to create a permanent setup to regularise industrial processes that have evaded environmental clearance and curtail public hearings for many industries.
- The new notification comes in the wake of recent attempts to dilute environmental safeguards and follows from a tradition to widen the escape route for violators or environmental regulations.
- Lack of Credibility: There are so many cases of fraudulent EIA studies where erroneous data has been used, same facts used for two totally different places etc. Often, and more so for strategic industries such as nuclear energy projects, the EMPs are kept confidential for political and administrative reasons.
- Public hearing: Public comments are not considered at an early stage, which often leads to conflict at a later stage of project clearance. A number of projects with significant environmental and social impacts have been excluded from the mandatory public hearing process. The data collectors do not pay respect to the indigenous knowledge of local people.
- Non transparency: Details regarding the effectiveness and implementation of mitigation measures are often not provided. Emergency preparedness plans are not discussed in sufficient details and the information not disseminated to the communities.
- Applicability: There are several projects with significant environmental impacts that are exempted from the notification either because they are not listed in schedule I, or their investments are less than what is provided for in the notification.

Wayforward:

- Independent EIA Authority, Sector wide EIAs needed and Creation of a centralized baseline data bank.
- Dissemination of all information related to projects from notification to clearance to local communities and the general public.
- The present executive committees should be replaced by expert people from various stakeholder groups, who are reputed in environmental and other relevant fields.

Conclusion

An EIA should not be used just as a means for obtaining an environmental clearance; rather, project proponents should use it as a management tool to assess the soundness of a project plan. The focus of EIA needs to shift from utilisation and exploitation of natural resources to conservation of natural resources.

55. Share your views on the suitability and sustainability of river interlinking project
for addressing the issue of water scarcity and floods.

Approach:

The student is expected to write about the inter-linking river project of the country, give a brief account of it. Then the student should write about the need of it and the sustainability of the projects over the course of time.

Introduction:

Inter Linking of Rivers refers to inter-basin water transfers between 2 or more rivers through human interventions on natural systems.
India's National Water Development Agency (NWDA) has suggested the interlinking of rivers of the country. The interlinking of rivers has two components: the Himalayan and the Peninsular. All interlinking schemes are aimed at transferring of water from one river system to another or by lifting across natural basins. The project will build 30 links and close to 3000 storages to connect 37 Himalayan and Peninsular rivers to form a gigantic South Asian water grid.

Body:

Large variation in rainfall and subsequent availability of water resources in space and time. Because of this variability of available water, floods and drought coexist in our country in same time and space. (Kerala, T.N and South Karnataka is facing drought while Rajasthan, Gujarat, Assam reeling under floods)

- It will most likely lead to Improved and expanded irrigation i.e., the project claims to provide additional irrigation to 35 million hectares in the water-scarce western and peninsular regions.
- The river interlinking project claims to generate total power of 34,000 MW (34 GW). It will lead to Ground water Recharging.
- The inter-link would create a path for aquatic ecosystems to migrate from one river to another, which in turn may support the livelihoods of people who rely on fishery as their income. It will contribute to flood and drought hazard mitigation for India Any multipurpose storage reservoirs in upstream countries, such as Nepal and Bhutan, would facilitate energy generation and other benefits.
- It also appears to promote national integration and a fair sharing of the country's natural water wealth.
- It will unify the country by involving every Panchayat as a share holder and implementing agency.
- Provide for enhancing the security of the country by an additional waterline of defense.
- Provide employment avenues for more than 10 lakh people for the next decade. It will most likely eradicate the flooding problems which recur in the northeast and the north every year.

- Solve the water crisis situation by providing alternative, perennial water resources.
- The large canals linking the rivers are also expected to facilitate inland navigation too.
- It aims at increasing food production from about 200mn tones a year to 500mn tones.
- It will most likely boost the annual average income of farmers, from the present $40 per acre of land to over $500

River Linking Project involves multifaceted issues and challenges related to environmental, economic, ecological, legal, political and social costs. It has potential for disastrous and irreversible adverse after-effects which has been comprehensively discussed below:

- Ecological Costs: Water scientists and Environmentalists have remarked that the water flowing into the sea is not waste. It is a crucial link in the water cycle. With the link broken, the ecological balance of land and oceans, freshwater and sea water, also gets disrupted It is feared that diversion of water from the Brahmaputra and the Ganges, which provide 85% of the country's fresh water flow in the dry season, would result into an ecological disaster.
- Economic Costs: As this project is of massive estimated cost, a long term planning and a sound financial simulation are required to meet the standard for such proposals. The huge expenditure of the project and the maintenance costs associated with the dams, canals, tunnels, and captive electric power generation will involve huge financial burdens. This may generate fiscal problems that are difficult to handle. This certainly requires financial assistance from the private sector as well as global capital agencies. Mobilization of global capital may ultimately entail the risk of destroying social welfare measures.
- Environmental costs: It will result in massive diversion of forest areas and submergence of land leading to deforestation and soil- erosion. (For example The Ken-Betwa link project puts in danger over 4,100 hectares of forest land or 8% of the Panna National Park). There will be destruction of rivers, aquatic and terrestrial biodiversity, fisheries and groundwater recharge. Possible downstream impacts, salinity ingress, pollution concentration, and increased methane emission from reservoirs are other adverse repercussions. Scientists are also of the view that river diversion may bring significant changes in the physical and chemical compositions of the sediment load, river morphology and the shape of the delta formed at the river basin. It could most likely create trigger points of natural disasters like landslides, earthquakes etc. as seen in case of Koyna dam and Tehri dam.
- Legal costs: Domestic and regional geo-politics play a pivotal role on the discussions on ILR. As of now, there is no mechanism as of now to deal with matters concerning inter-basin transfers. There are also important institutional and legal issues to be sorted out. Each of the 30 schemes of the ILR is supposed to get through several statutory, legal and procedural steps.
- Social Costs: Reconstruction and rehabilitation due to displacement is not an easy task as seen before. The construction of reservoirs and river linking canals in the peninsular component alone expect to displace more than 5, 83,000 people

and submerge large areas of forest, agriculture and non-agriculture land. It is likely to create social unrest/psychological damage and cultural alienation due to forced resettlement of local indigenous tribal community.

- Political Implications: Water being a state subject, the ILR plan further complicates existing water sharing and management problems between the riparian states. Some of the ILR schemes have international implications, which may create strained relationship with neighbouring countries like Bhutan, Nepal and Bangladesh.

Conclusion:

NRLP has its fair share of positives and negatives. Though there are enough apprehensions over the project but they are not backed by any comprehensive scientific evidence to it. Inter basin water transfer is not a new concept.

Large direct benefits of irrigation, water supply and hydropower and indirect benefits navigation, tourism, employment generation etc can be accrued in ILR program.

Formation of River Basin Authority for coordinated action and subsequent building up of consensus among concerned States is prima facie needed. Legal provisions for implementation of ILR related to rehabilitation and appropriate afforestation through CAMPA is to be concurrently addressed.

It is essential that needed environmental safeguards such as comprehensive EIA and SIA are properly implemented in a coordinated manner by various agencies. Therefore, strengthening and expansion of cooperative efforts among the co-basin states and countries will foster co-riparian relationships.

India's river linking project shows and promises a great concern for water conservation and optimum use of available water resources. Undoubtedly, it is the need of the hour to have a water mission like as IRL, which will enable availability of water to the fields, villages, towns and industries throughout the year post a comprehensive scientific assessment.

56. What are the regions in India that suffer from the challenge of desertification. Explain the causative factors that lead to desertification.

Approach:

Candidates are expected to write about desertification and also highlight the regions that suffers the challenge of desertification in India. Also explain the causative factors that lead to the desertification.

Introduction

As per UNCCD Desertification is not the natural expansion of existing deserts but the degradation of land in arid, semi-arid, and dry sub-humid areas. It is a gradual process of soil productivity loss and the thinning out of the vegetative cover because of human activities and climatic variations such as prolonged droughts and floods.

Body

Regions suffering from desertification in India:

- According to Desertification and Land Degradation of Selected Districts of India, an atlas published by the ISRO SAC, some 96.40 million ha, or about 30 per cent of the country's total area, is undergoing degradation.
- In terms of India's total geographical area, the states of Rajasthan, Gujarat, Maharashtra, Jammu and Kashmir, and Karnataka have the highest area of lands undergoing degradation/desertification, amounting to 18.4% (out of India's total 29.3%) while all the other states each had less than 2% of degraded lands.
- But when considering the area within the states, Jharkhand followed by Rajasthan, Delhi, Gujarat, and Goa, had the highest area of degraded lands, representing more than 50% of their area. In comparison, the land area undergoing degradation/desertification in Kerala, Assam, Mizoram, Haryana, Bihar, Uttar Pradesh, Punjab, and Arunachal Pradesh was less than 10%.

Causative factors for desertification:

- Soil Erosion: It is responsible for 10.98 percentage of desertification. Soil Erosion is the loss of soil cover mainly due to rainfall and surface runoff water. Water erosion is observed in both hot and cold desert areas, across various land covers and with varying severity levels.
- Vegetation Degradation: It is responsible for 8.91 percentage. Vegetation degradation is observed mainly as deforestation / forest-blanks / shifting cultivation and degradation in grazing/grassland as well as in scrubland. Destruction of vegetation, most often by humans, accelerates desertification.
- Salinity: It occurs mostly in cultivated lands, especially in the irrigated areas. Soil salinity refers to the water dissolvable salt present in the soil. Salinity can develop naturally, or human-induced.
- Cultivation of sugarcane: Sugarcane, which is only grown in 4% of the total cultivable land, guzzles 80% of the water resources. As a result, a slight

change in the meteorological cycle is enough to cause a full-blown water crisis.

- Government neglect: For example Under Maharashtra Irrigation Act of 1976, the government can notify people in the command area not to go in for water-intensive crops like sugarcane in the case of acute water scarcity. But there have been no efforts from the government side especially in Marathwada region.
- Unplanned urbanisation: Economic development has led to expansion of urban and industrial land. Much of the present urban and industrial development has taken place on agricultural land. The expansion of cities has resulted in the encroachment of forest areas and wetlands. For example, rapid urbanisation triggered by a population increase in coastal areas has caused coastal land degradation.
- Climate Change: Climate change plays a huge role in desertification. As the days get warmer and periods of drought become more frequent, desertification becomes more and more eminent. Further rise in incidents like forest fires are destroying forests and leading to rise in desertification.

Way forward:

- Afforestation: Forest degradation accounts for the major share of land degradation costs of India highlighting the need to prevent forest degradation. Further, strategy to reduce forest dependence for fuelwood, fodder and non-timber forest products should be made. Efforts must be made for afforestation.
- Preventing overgrazing: Farmers should be discouraged from overgrazing activities. They must be made aware of the harm of overgrazing to land productivity.
- Sustainable agriculture: Climate resistant crops need to be developed and used. Efforts must be made to make farmers aware of overuse of chemical fertilisers. Subsidy may be removed for the same and replaced by Cash transfer.

Conclusion

Ending desertification is the best chance the world has to stabilize the effects of climate change, save wildlife species and protect our well-being. Protecting the forest is our mutual responsibility, which should be carried out by people and governments worldwide.

57. Comment upon the philosophical basis and objectives of left wing extremism?

Approach

Candidates are expected to write about Left wing extremism and comment on their objectives and philosophical basis.

Introduction

In the review meeting on LWE, the Union Home Minister has termed Left-Wing Extremism (LWE) as one of the major internal security threats faced by the nation. However, events of Left Wing Extremism (LWE) violence came down from 2258 in 2009 to 833 in 2018.

Body

LWE Origins –

- Tebhaga movement it was the first communist movement which started in West Bengal in 1946. Telangana movement which was led by the people of Telangana in the period of 1946-51 against the atrocities of the Nizam rule also acquired radical dimensions as it progressed.
- The origins of the LWE can be traced back to 1967 in the three areas of Naxalbari (from which the term Naxal originates), Phansidewa and Khoribari in West Bengal's Darjeeling District.
- The initial uprising was led by Charu Majumdar, Kanu Sanyal and Jangal Santhal, who were members of the Communist Party of India (Marxist). The initial uprising was in the form of a peasant revolt. Two years later in 1969, the Communist Party of India (Marxist–Leninist) was formed.
- Although originated in West Bengal, the movement spread to the less-developed rural regions of southern and eastern India, in Telangana, Andhra Pradesh, Odisha and Chhattisgarh.
- The Maoist Communist Centre (MCC) was formed in 1975. This group merged with the People's War Group in 2004, to form the CPI (Maoist).

Philosophical basis of Left wing extremism –

- Naxalism in India, like any other leftist movement around the globe draws its ideological basis from the Russian revolution wherein Lenin successfully fought against the Czar through a combination of peasant movement and an armed struggle. The prime intent was to bestow power in the hands of the exploited and marginalized and enforce societal control over governance and nation building.
- After the success of the Lenin-led revolution in Russia, the intellectual class in many countries started thinking of ushering in a change in their respective nations. Prominent amongst them were Fidel Castro and Mao Zedong. In

China, Mao Zedong used this philosophy successfully which led to the origin of 'Maoism'. Maoism is a doctrine that teaches to capture State power through a combination of armed insurgency, mass mobilisation and strategic alliances. Mao called this process, the 'Protracted People's War'. 'Political power grows out of the barrel of a gun' is the key slogan of the Maoists.

- Naxalites are far-left radical communists who derive their political ideology from the teachings of Mao Zedong.

Objectives of the LWE –

- The objective of the Naxalites is to wage an armed revolution, modeled on the lines of the Chinese Revolution, which they call New Democratic Revolution (NDR), and usher in their own form of government.
- The Naxalites state their main political purpose as establishing an alternative state structure in India by creating a "red corridor" in Naxalite-affected states, stretching from the border of Nepal to central India to Karnataka in the south through violent struggle.
- The LWE organisations, in pursuit of their stated goal of overthrowing the government, resort to armed violence against anyone they perceive to be their enemy, and this includes innocent civilians also.
- In many instances, they carry out high-profile murders and kidnappings to instil fear in their opponents and civilians.
- In many cases, they get the support of the tribal population in an area since they are seen as deliverers, in a situation where the authorities have failed to provide the basic amenities.

Way forward –

- The D Bandopadhyay Committee (2006) highlighted the lack of governance, economic, socio-political and cultural discrimination against the tribals as the chief reason for the spread of Naxalism. The Committee recommended tribal-friendly land acquisition and rehabilitation as a means to counter this issue.
- Operation SAMADHAN The policy was initiated in 2015 as a multidimensional approach to tackle LWE.
- States also need to adopt a focused time-bound approach to completely eliminate LWE groups and ensure all-round development of the affected regions.

Conclusion

Naxalism is an internal security matter and is not just a law and order problem also – it has grown into a big headache for both people and government. But its roots lie in deep discontent that apathy of government bred towards poor tribes of these regions. Only through addressing those problems it is possible to stop the further spread of left wing extremism. Whenever naxals indulge in violence, and obstruct development works being implemented, government must deal with sternly but as home ministry warned officials, without violating standard operation methods.

58. Discuss the strategy adopted by the government to address the security threats emanating from external state and non-state actors.

Approach

Since the question is asking you to discuss hence it necessitates a debate where reasoning is backed up with evidence to make a case for and against an argument and finally arriving at a conclusion.

Introduction

External vulnerabilities that pose challenges to India's national security can be by either by state or non-state actors. 'State actor' is used in the context where one government supports an actor in the performance of an act or acts of terrorism against the other often deemed as a state sponsor. Organizations and individuals not connected with, directed by, or funded through the government are non-state actors.

Body

THE STRATEGY ADOPTED BY THE GOVERNMENT TO ADDRESS THE SECURITY THREATS EMANATING FROM EXTERNAL STATE AND NON-STATE ACTORS –

- A lesson from our ancient history, oft-forgotten, is the imperative of internal unity in the country. The government believe that external challenges can be handled adequately when the nation retains internal cohesiveness and that remain the part of strategy.
- That most of India's internal security challenges have an external dimension to it is well known, government is trying to factor in the linkages between the two to shape our response.
- In dealing with the situation in J&K, in Naxalism affected areas and the Northeast, the government is using the correct amalgam between sound security measures and exhibiting compassion cum sensitivity to the local populace.
- In a democracy, legitimate protests are normal and thus governments at the Centre and states are trying not to get unduly perturbed over these and deal with dissent sympathetically and not treat those who differ from the establishment's views as anti-nationals.
- The government is trying to make the DRDO and the many ordnance factories it has under its ambit far more accountable and effective.
- India has a vibrant private sector too with some having a reasonably good record in defence production. The government is giving the private sector a level playing field and an assurance of purchasing their output to give a fillip to indigenous defence production.

- In addition, the government is trying to ensure that as it pays huge amounts to foreign military entrepreneurs while importing state-of-the art equipment, it insist upon transfer of critical technologies, and ultimately production of the same platforms, weapons, ammunition, spares etc., within the country. With many security challenges confronting the nation, there is no alternative to indigenous defence production.

Apart from the strategy, India must also carry out an institutional, periodic holistic review of the many security organisations and structures it has to ensure their greater effectiveness. The Chief of Defence Staff appointment, now a year old since its inception, must prevail upon the government to issue a comprehensive National Strategic Security Document which lays down a roadmap prioritization of India's short, medium and long-term perspective plans.

Conclusion

As India rises to confront all challenges to its well-being and security in 2021, the need of the hour is restoring India's economic health, ensuring unfailing internal cohesion, fidelity to the Constitution and overall security preparedness with greater vigor and planning.

59. Can lack of development be attributed as the most significant contributor towards the spread of left wing extremism in India? Critically comment.

Approach

As the directive is critically comment students are expected to write both the aspects of the lack of development as the significant factor towards the spread of left wing extremism in India.

Introduction

Left-wing extremism, also known by various other names such as Naxalism and Maoism, is a form of armed insurgency against the State motivated by leftist ideologies. Left-wing extremists are also known as Maoists globally and as Naxalites in India. There are several left-wing extremist organizations in the country operating in many areas. They reject parliamentary democracy and are aiming at waging an armed revolution against the government. They follow extreme violence and also harm innocent civilians in many cases. Some groups also engage in parliamentary politics while at the same time, maintain underground cadres. Examples of such groups: Communist Party of India (Marxist-Leninist) Liberation and the Communist Party of India (Marxist-Leninist) Janashakti.

Body

Lack of development and spread of left wing extremism in India –

- Naxalbari, a village near Siliguri North West Bengal, became infamous in 1967 as it revived left wing extremism in India. Charu Mazumdar was active leader of the area and was mobilizing peasants against state for an armed conflict. On the other hand there were repetitive incidences of Class conflicts between peasants and zamindars. One such conflict escalated and zamindar was expelled from his land. After this police came to his rescue and was surrounded by about thousand peasants armed with bows, arrows, lathis etc. this became the tipping point for the rise of naxalite movement in India.
- Heavy state response kept violent incidents under control in 1970's but it got push in 1980's. This time it was from Andhra Pradesh. Actually, in 1967 itself movement also started in Srikakulam, Andhra Pradesh. Here revolutionaries tried to mobilize tribals into armed militias called 'dalams', by inciting them against landlords, money lenders and government.
- They resorted to 'annihilation of class enemy' under which people those represented state i.e. government servants, Forest officials and other oppressive characters such as money lenders and landlords, were to be identified and killed.
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tried to mobilize tribals into armed militias called 'dalams', by inciting them against landlords, money lenders and government. They resorted to 'annihilation of class enemy' under which people those represented state i.e. government servants, Forest officials and other oppressive characters such as money lenders and landlords, were to be identified and killed.

- Naxalism is spread in the most backward areas of the country this backwardness becomes breeding ground to motivate and recruit the people into their own folds exploitation by money lenders and faulty land reforms amplified the backwardness and hence became the significant reasons for the spread of naxalism in India.

However lack of development is not the only reason for the spread of Naxalism in India, there are other reasons which lead to the spread which are as follows –

- Forest mismanagement was one of the main causes of the spread of Naxalism. It originated during the time of British administration when new laws were passed to ensure the monopolization of the forest resources. Following the globalization in the 1990s, the situation worsened when the government increased the exploitation of the forest resources. This led the traditional forest dwellers to fight for their aspirations against the government through violence.
- Haphazard tribal policy implementation, marginalization, and displacement of the tribal communities worsened the situation of Naxalism.
- The increase in the interregional and intraregional differences and inequalities led to people choosing Naxalism. Naxal-groups mostly consist of the poor and the deprived like the anglers, small farmers, daily labourers, etc. The government policies have failed to address this issue.
- The poor implementation of the land reforms has not yielded the necessary results. India's agrarian set up is characterised by the absence of proper surveys and other details. Due to this reason, it has greatly damaged the rural economy and anti-government sentiments were high among those who were deprived and exploited by the local landowners.
- Forest cover in India is the main area of operation for these groups. The government is facing difficulties while dealing with the insurgents due to the lack of accessibility to these areas.
- The unemployed youth in India is one of the major supporters of the Naxalism movement. This group mostly consists of medical and engineering graduates. The universities have become one of the major breeding grounds for radical ideology.

Conclusion

The concerted effort from both the Centre and Naxal-affected states is a rare example of cooperative federalism. Comprehensive COIN strategy, encompassing both the population-centric and enemy-centric approaches has significantly reduced the Naxal footprint in many of the militant groups in the region. Yet, the Naxalites

still remain a formidable force that can nevertheless be considered a threat to India's national security. However, unlike in the 2000s, the Indian government is well prepared in addressing this issue through a comprehensive strategy that is already in place

60. Discuss the recent strategies adopted by the government to address the challenge of naxalism.

Approach

A simple and straightforward question where in the candidate needs to discuss the recent strategies adopted by the government to address the challenge of naxalism.

Introduction

Naxalism can be traced backed to its origin in Naxalbari village of West Bengal state. It started as a movement to voice its concerns by landless labourers and tribals and gradually has become an internal security threat to the country. Also, Left Wing Extremism or Naxal Movement has become a source of extreme violence in many parts of the country.

Body

LWE/Naxalism is considered to be the most important internal security concern. These extremists attack the symbols of the country's power such as the police, schools and other government institutions. In this regard, strategies to deal with Naxalism, including the recent one's are –

- Left Wing Extremism (LWE) Division: It was created in the Home Ministry to effectively address the Left Wing Extremist insurgency in a holistic manner. It implements security related schemes aimed at capacity building in the LWE affected States.
- SAMADHAN strategy of government to frame short term and long term policies to tackle LWE. The acronym SAMADHAN stands for Smart leadership, Aggressive strategy, Motivation and training, Actionable intelligence, Dashboard Based KPIs (key performance indicators) and KRAs (key result areas), Harnessing technology, Action plan for each theatre, and No access to financing.
- Government has formulated National Policy and Action Plan adopting multipronged strategy in the areas of security, development, ensuring rights & entitlement of local communities etc. This has several sub-schemes like Security related expenditure scheme(2017-20), Special Central Assistance scheme which involves modernisation of police force, Civic action program which aims at bridging the gap between Police and locals through personal interaction.
- Media Plan: The Maoists have been misguiding and luring the innocent tribals/ local population in LWE affected areas. To deal with their false propaganda, activities like Tribal Youth Exchange programmes organised by NYKS, radio jingles, documentaries, pamphlets etc. are being conducted.
- Aspirational District: The Ministry of Home Affairs has been monitoring Aspirational districts programme in 35 LWE affected districts.

- Modernisation and upgradation of the State Police and their Intelligence apparatus and fortification of Police stations. Further, Improvement in governance and public perception management, Better equipment of CRPF, Setting up of Counter Insurgency and Anti-Terrorism (CIAT) schools, Facilitating inter-State coordination and Assistance in community policing and civic action programmes can help.
- Institutional measures like Blank Panther Combat Force (in line with the Greyhounds of Andhra and Telangana region), Bastariya battalion (locals joining as police, who are well informed of the terrain), multidisciplinary groups under MHA to check funding to the Naxalites.
- Government is aiming for capacity building and skill development of the locals, schemes like ROSHNI that aims at providing jobs to the locals, the Ekalavya model residency schools for better educational facility to tribal children.
- Government is also working on Economic Inclusion, like providing support prices for Minor forest produce (MFP), establishing Van Dhan Kendras to aid tribal income. The Surrender and Rehabilitation policy too, has seen success to some extent

2nd ARC recommendations to overcome red corridor challenges –

- For effective implementation of the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Rights) Act, 2006, multidisciplinary Oversight Committees may be constituted to ensure that the implementation does not adversely affect the local ecosystems.
- Special efforts are needed to monitor the implementation of constitutional and statutory safeguards, development schemes and land reforms initiatives for containing discontent among sections vulnerable to violent left extremism.
- Performance of the States in amending their Panchayati Raj Acts (PESA) and implementing these provisions may be monitored and incentivised by the Union Ministry of Panchayati Raj.
- Special anti-extortion and anti-money laundering cell should be established by the State police/State Government. To break the nexus between illegal mining/forest contractors and transporters and extremists which provides the financial support for the extremist movement.

Conclusion

For the holistic last-mile development of “New India”, it is necessary to get rid of the menace of such radicalized groups & the synergized efforts of the Centre and the States are crucial in achieving the same where both should continue to follow the two pronged strategy i.e. ensuring safety of the people in the naxal-affected regions as well as taking initiatives for the development of such rergion.

61. Why is fake news considered a serious internal security threat? Analyse.

Approach

Since the question is asking you to analyse, you are expected to break an issue into constituent parts and explain how these relate to one other and present as one summary.

Introduction

The word 'Fake News'- Word of the Year, 2017 by Collins Dictionary got popularised in the 2016 US Presidential election and Brexit. It is much debated in communication fields and social sciences as it has the potential to polarise public opinion, to incite violence and extremism.

Body

WHY FAKE NEWS IS CONSIDERED A SERIOUS INTERNAL SECURITY THREAT?

- Fake news has the potential to polarise public opinion, to promote violent extremism and hate speech and, ultimately, to undermine democracies and reduce trust in the democratic processes.
- The countries which are already suffering from ethnic tensions, misinformation can exasperate a lot of tensions and can also generate violence.
- Rumours spread through fake news can create a lot of social turmoil in a country or among the countries.
- In perhaps, the well-known case, Myanmar during the Rohingya crises Facebook was used as a tool or weapon by the people to incite violence against the Rohingya Muslims.
- Buddhists were influenced by the rumors which led them to target Muslims. To retaliate the harm caused on Muslim in Myanmar, Indian Muslim attack Bodh Gaya temple of India.
- In India, rumors spread by Whatsapp led to many communal riots. Riot in Muzaffarnagar in 2013 where around 50 people were killed is the example of one such case out of many which takes place every year.
- Jammu & Kashmir witnessed internet shutdowns quite in high frequency after any military operation takes place or after any act related to the state, which is of sensitive nature, is passed by the legislature in order to restrict the circulation of fake news and misinformation which can make situation worst.
- Across the country, there is a rise in numbers of mob attacks fueled by rumors spread by using social media handles like Whatsapp, Facebook, twitter etc.

- Fake news, state-funded disinformation and propaganda directly challenge the question of national security and the democratic set-up of any nation. The whole system and set-up have turned into more complicated and complex state, and the challenges that it present cannot be met by mere simple solutions; they require open, deep and critical analysis.

Conclusion

Fake news and disinformation are definitely a threat to a nation's security both externally as well as internally. There is need of codified rules in order to check the authenticity and reason of arrest of rumor-monger by official. Online platform, social media or other such private companies that act as a platform to communicate, too has desired role to play in this process of curbing fake news. It is their responsibility to check the validity of information and disclose the details creator before passing liability to government to do the same. It is a responsibility of every individual to combat the scourge of fake news. It can include improving digital literacy among the general public and supporting investigative journalism.

62. What are the most common international destinations used for money laundering? What measures have been taken to control it?

Approach

The candidate needs to elaborate upon the most common international destinations used for money laundering in the first part of the answer while in the second part, one needs to show some measures taken to control it.

Introduction

Money laundering is the processing of criminal proceeds to disguise their illegal origin. It is the concealing or disguising identity of illegally obtained proceeds so that they appear to have originated from legitimate sources. It is frequently a component of other, much more serious, crimes such as drug trafficking, robbery or extortion. According to the IMF, global Money Laundering is estimated between 2 to 5% of World GDP.

Body

- As money laundering is a consequence of almost all profit generating crime, it can occur practically anywhere in the world. Generally, money launderers tend to seek out countries or sectors in which there is a low risk of detection due to weak or ineffective anti-money laundering programmes.
- Money laundering activity may also be concentrated geographically according to the stage the laundered funds have reached. At the placement stage, for example, the funds are usually processed relatively close to the under-lying activity.
- With the layering phase, the launderer might choose an offshore financial centre, a large regional business centre, or a world banking centre – any location that provides an adequate financial or business infrastructure.
- Finally, at the integration phase, launderers might choose to invest laundered funds in still other locations if they were generated in unstable economies or locations offering limited investment opportunities.
- Currently, The Financial Action Task Force (FATF) has 'call for actions' in Iran and Dem. Rep Korea. These countries are considered very high risk and are not members of any anti-money laundering (AML) organisations, meaning no laws are in place to help combat money laundering.
- According to the Basel anti-money laundering index, the top 10 countries currently facing the greatest risk of money laundering are – Afghanistan (8.16), Haiti (8.15), Myanmar (7.86), Laos (7.82), Mozambique (7.82), Cayman Islands (7.64), Sierra Leone (7.51), Senegal (7.30), Kenya (7.18), and Yemen (7.12).

Steps Taken to Prevent Money Laundering –

- **The Vienna Convention:** It creates an obligation for signatory states to criminalize the laundering of money from drug trafficking.
- **The United Nations office on Drugs and Crime:** It proactively tries to identify and stop Money Laundering.
- **The Financial Action Task Force:** It has been set up by the governments of the G-7 countries at their 1989 Economic Summit, has representatives from around the world. It monitors members' progress in applying measures to counter Money Laundering.
- **India** is a full-fledged member of the FATF and follows the guidelines of the same. Further, Financial Intelligence Unit-IND is an independent body reporting directly to the Economic Intelligence Council (EIC) headed by the Finance Minister.
- **Criminal Law Amendment Ordinance (XXXVIII of 1944):** It covers proceeds of only certain crimes such corruption, breach of trust and cheating and not all the crimes under the Indian Penal Code.
- **The Smugglers and Foreign Exchange Manipulators (Forfeiture of Property) Act, 1976:** It covers penalty of illegally acquired properties of smugglers and foreign exchange manipulators and for matters connected therewith and incidental thereto.
- **Narcotic Drugs and Psychotropic Substances Act, 1985:** It provides for the penalty of property derived from, or used in illegal traffic in narcotic drugs.
- **Prevention of Money-Laundering Act, 2002 (PMLA):** It forms the core of the legal framework put in place by India to combat Money Laundering. The provisions of this act are applicable to all financial institutions, banks (Including RBI), mutual funds, insurance companies, and their financial intermediaries.
- **PMLA (Amendment) Act, 2012:** Adds the concept of 'reporting entity' which would include a banking company, financial institution, intermediary etc. It has provided for provisional attachment and confiscation of property of any person involved in such activities.
- **Enforcement Directorate (ED):** It is a law enforcement agency and economic intelligence agency responsible for enforcing economic laws and fighting economic crime in India.

Conclusion

In addition to creating laws that criminalize the laundering of the proceeds of crime, India must also enact strict compliance programs for the financial industry that make it more difficult to launder money. India must negotiate additional Mutual Legal Assistance Treaties with other countries. MLATs are invaluable to international judicial assistance. If India intends to curb its escalating drug problem, it must take an aggressive stance with respect to money laundering.

63. How does India's complex geography in the border regions aggravate the internal security challenges? Discuss.

Approach

Candidates are expected to write about internal security challenges and how India's unique and complex geography in border regions aggravate the internal security challenges.

Introduction

Border Management is an integral approach towards borders in which along with security enhancement, infrastructure & human development is undertaken. The challenge of coping with long-standing territorial and boundary disputes with China and Pakistan, combined with porous borders along some of the most difficult terrain in the world, has made effective and efficient border management a national priority.

Body

Complex geography in the border region aggravating the internal security challenges-

- Varied terrain, climatic conditions and hostile neighbours make our borders complex and border management an important aspect of our security.
- Managing such an expansive border is a complex task. Challenges related to border security include unsettled maritime boundaries, lack of fully demarcated land borders, and borders based on artificial boundaries. This porosity of borders facilitates various illegal activities such as smuggling, trafficking of humans, drugs and arms and infiltration.
- On Indo Bangladesh border entire stretch consists of plain, riverine, hilly/jungle and with hardly any natural obstacles. The area is heavily populated, and at many stretches the cultivation is carried out till the last inch of the border.
- Density of population in the border areas at some places is approximately 700-800 persons per square km on the Indian side and about 1,000 persons on the Bangladesh side.
- Instead of following natural barriers, it meanders through villages, agricultural lands, and rivers, rendering the border extremely porous with many disputed pockets. Undemarcated stretches, existence of enclaves (chhit-mohols), and adverse possessions had been causing constant friction between the border guarding forces of India and Bangladesh.
- The location of the Indo-Myanmar boundary throws up many challenges for the effective management of the boundary. The rugged terrain makes movement and the overall development of the area difficult. The internal dynamics of the region in terms of the clan loyalties of the tribal people,

inter-tribal clashes, insurgency, and trans border ethnic ties also adversely affect the security of the border areas.

- In a place like Galwan Valley first major factor is acclimatisation since the oxygen supply reduces drastically. Next, the load carrying capacity of individuals reduces drastically. Things move very slowly in the mountains and mobilisation of troops consumes time. Thus, time and place need to be kept on top priority when deciding where the troops have to be stationed and how they have to be mobilised.
- Frost, inhabitable conditions and sub-zero temperature are deadlier than bullets at the world's highest military post-Siachen which is part of a disputed region between India and Pakistan. Several incident where Indian Army personnel died after an avalanche hit their post, brings to fore the rising number of death at the the world's highest battlefield where not a single death has occurred due to a bullet wound since 2003.
- India Pakistan border need patrolling in riverine areas and water-patrol teams have been deployed at the Chenab River, primary reason is the difficult terrain characterised by lofty mountains, several cross-border streams and dense growth of elephant grass.
- The Indian military Border Security Force (BSF) patrols Sir Creek up to midstream using floating border posts, amphibious vehicles, and foot travel by the Creek Crocodile Commandos. The coastal area of Sir Creek is manned by the Indian Coast Guard, and the larger open sea beyond is patrolled by the Indian Navy.

Conclusion

Defence preparedness should be vigorously pursued to insulate us from unpleasant surprises. The vision should be to establish with utmost urgency, stable, viable and peaceful national boundaries, all around, so that India can proceed, unhindered, with the vital tasks of nation-building and socio-economic development.

64. What role do intelligence agencies play in securing the country? Illustrate.

Approach

A simple and straightforward question where in the candidate needs to show role of intelligence agencies in security of the country.

Introduction

Gathering intelligence and information by means of espionage has been a key element to the survival of nations ever since their existence. However, there has been a major change in the way intelligence agencies work ever since the evolution of technology and the unthinkable amount of advances in the way people live their everyday lives.

Body

- The role of intelligence agencies has changed dramatically; Intelligence agencies are not mere data collection and analysis units anymore, they are full-fledged covert armies, called upon to take action when no one else can.
- The Cold War saw the further evolution of intelligence agencies, introduction of “larger foreign policy focus”. The U.S.A saw the U.S.S.R as keeping her administration from a more “comprehensive foreign policy”.
- Intelligence acts as the escutcheon of a nation. However the success of intelligence agencies in protecting the nation is never reported in the media for obvious reasons. It is only their defeats, mistakes and controversies that are reported.
- Striking the balance between allowing intelligence agencies to carry out activities to promote their citizens security and the limitations to these activities is vital. Hence, the role of intelligence in modern warfare is still somewhat obscure.

Further, the role of intelligence agencies in securing the country can be seen from following points –

- Collection: as a function of intelligence, appears straightforward, and its necessity is not seriously challenged. Through various means, intelligence agencies collect information about foreign persons, places, events, and activities that is needed by the Government but cannot be obtained through publicly available sources or diplomatic contacts.
- Analysis: The analytical function raises similar practical issues. In theory, intelligence analysts take information provided by perhaps all three collection disciplines, combine it with information from publicly available sources, and produce "all source" analysis for the customer. Because the analysis contains information obtained by intelligence sources, it is typically classified.

- Covert Action: are used to influence political, military, or economic conditions or situations abroad, where it is intended that the role of the Government will not be apparent or acknowledged publicly. These might consist of technical and logistical assistance to other governments to deal with problems within their countries, or actions undertaken to disrupt illicit activities that threaten government's interests, e.g. terrorism or narcotics trafficking.
- Counterintelligence: The counterintelligence function involves protecting the country, as well as intelligence agencies, from the activities of foreign intelligence services. The RAW is responsible for coordinating India's counterintelligence activities abroad.
- Further, intelligence also involves support to country's Diplomacy, support to Monitoring of Treaties and Other Agreements, support to Military Operations, Economic Intelligence, etc.

Conclusion

The paradigm shift in the nature of the security challenges facing the country lends urgency to the need for strengthening country's intelligence apparatus. There is a need for comprehensive, not ad hoc and piecemeal, changes where the focus should be on removing the deficiencies within the system, improving coordination between intelligence agencies and ensuring better accountability and oversight.